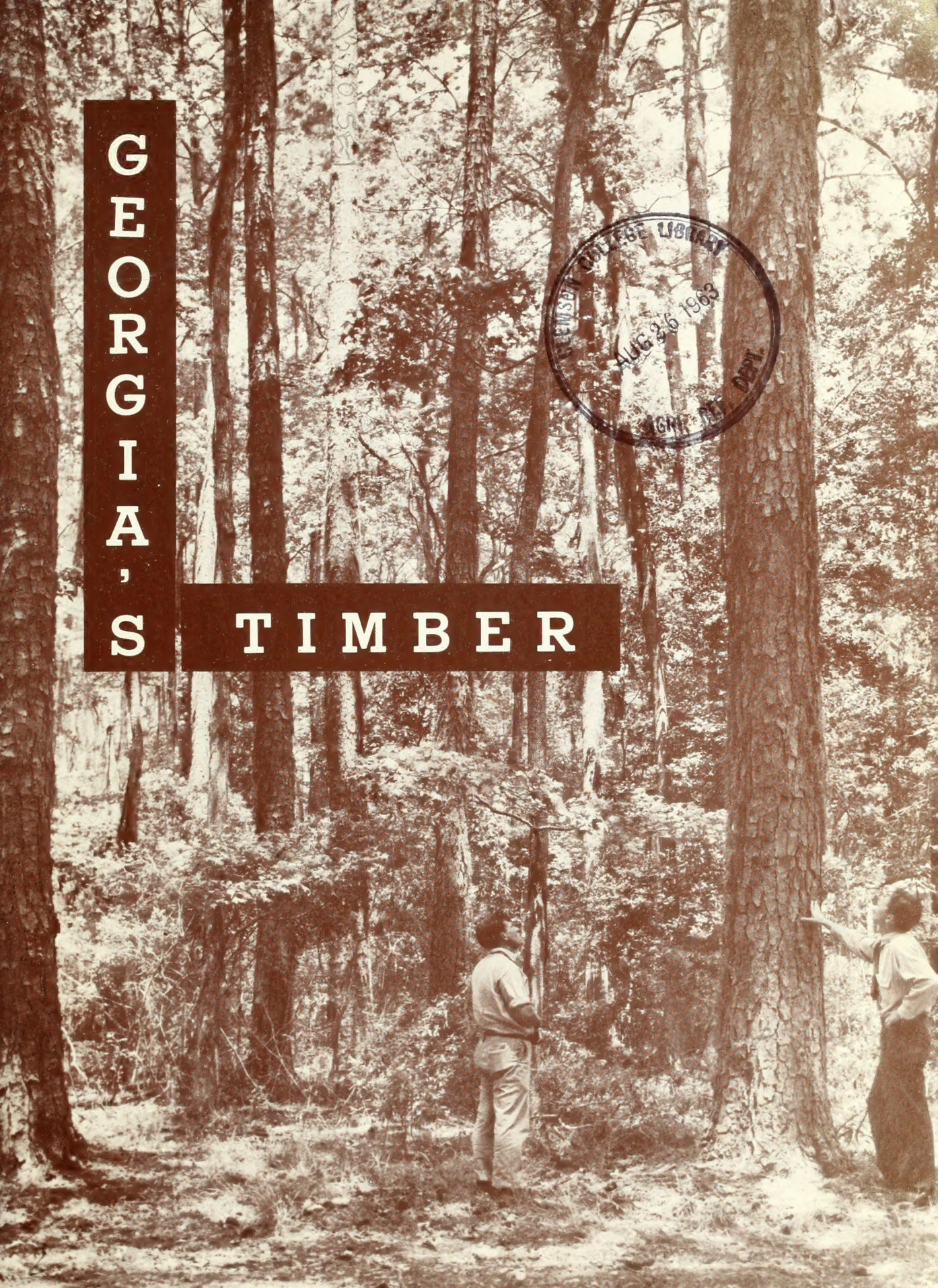
Digitized by the Internet Archive
in 2013

http://archive.org/details/resourcebulletin115sout

GEORGIA'S TIMBER



GEORGIA MILITARY COLLEGE LIBRARY
AUG 26 1963
AGRI. REF. DEPT.

Foreword

The survey of Georgia's forests reported here was completed in August 1961. It is the third in a series conducted by the U. S. Forest Service. The first was completed in 1936 and the second in 1953. Comparisons between the three surveys show significant changes taking place in the timber supply outlook.

The Georgia Forest Survey is part of a continuing nationwide undertaking by the regional experiment stations of the U. S. Forest Service. The general objective is to make periodic inventory of forest lands, their extent, condition, and volume of timber, to ascertain rates of forest growth and depletion, to estimate present consumption of timber products and probable future trends in timber requirements, to analyze and make available Survey data which provide a sound basis for formulation of forest policies and programs on a National, State, and local level, and to make resurveys as necessary to keep basic information up to date.

The field work, compilation of data, and preparation of this report represent the combined efforts of many people. The Southeastern Station wishes to acknowledge the cooperation of the following in assisting the Survey with funds, men, and equipment:

Armstrong Cork Company
Bowaters Southern Paper Corporation
Champion Papers, Inc.
Commercial Bank of Thomasville, Georgia
Continental Can Company, Inc.
Cordele Sash and Door Company
Georgia Forestry Association, Inc.
Georgia Forestry Commission
Georgia Forest Research Council
Georgia Kraft Company
International Paper Company
Owens-Illinois Glass Company
Southern Bell Telephone and Telegraph Company
St. Regis Paper Company
Union Bag-Camp Paper Corporation
West Virginia Pulp and Paper Company

U. S. FOREST SERVICE
RESOURCE BULLETIN SE-1

GEORGIA'S TIMBER

by

Robert W. Larson and Benjamin Spada

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SOUTHEASTERN FOREST EXPERIMENT STATION
ASHEVILLE, NORTH CAROLINA

1963

Contents

	Page
Highlights	1
Timber trends	3
More forest area	3
Better stocking	5
More timber volume	5
Timber smaller but less defective	5
Timber growing faster	6
More timber cut	7
More pulpwood, less saw-log production	7
Georgia pine—source of naval stores	9
Timber supply outlook	10
Regeneration outlook	10
Mortality outlook	11
Level and distribution of cut	11
Available cut	11
Timber-growing opportunities	12
Growth	12
Stand improvement	13
Regeneration	15
Forestry outlook	16
Appendix	17
Accuracy of the survey	17
How the forest inventory is made	17
Definitions of terms	18
Index to detailed tables	22

Figure 1. *Forest Survey Units in Georgia.*

Highlights

Forest area is increasing. During the past 25 years the area of commercial forest land in Georgia increased 4.5 million acres—a gain of 21 percent. Most of this increase has taken place in Piedmont Survey Unit 3 (fig. 1), where as a result of planting and natural reseeding of pine, large areas of former cropland are now forest land.

Forest land is better stocked. The basal area density of all live trees 1.0 inch d.b.h. and larger has increased about 1 percent annually during the past 25 years, with the rate of increase being slightly greater since 1953. Pine and hardwood stocking increased in about the same proportion—pine trees still accounting for about 45 percent of the total stocking and about 55 percent of the growing-stock volume.

Timber volume is increasing. Since 1936, softwood growing stock increased 19 percent and hardwood 26 percent. The upward trend in hardwoods seems to be leveling off, but softwood volume has increased faster during the past 8 years than between the first two surveys.

Timber on the average is smaller but less defective. The proportion of softwood growing stock in sawtimber trees 15.0 inches and larger has dropped from 27 percent to 14 percent. The large hardwood sawtimber proportion has declined from 37 percent in 1936 to 27 percent in 1961. Today, loss of cubic-foot volume due to rot is negligible in both softwood and hardwood—less than 1 percent for softwoods and about 1 percent for hardwoods. Other defects such as sweep, crook, and forking still reduce the usable volume for saw logs by 7 percent in softwoods and by 9 percent in hardwoods.

Margin of softwood growth over cut increasing. Better stocking with younger and more vigorous trees has resulted in a 42-percent increase in net growth of softwoods since 1936. The softwood cut has also increased, but by only 23 percent. In 1936, growth of softwood growing stock barely exceeded the cut, but by 1961 there was an excess of 17 percent. Softwood sawtimber growth, which failed to replace cut by a substantial margin in 1936, now exceeds the cut by 11 percent. Hardwood growth, on the other hand, has not kept pace with the increase in cut and mortality; by 1961, total growth barely replaced the cut, while sawtimber growth failed to replace the cut.

Ample supply of trees for gum naval stores. The number of trees worked for gum dropped from 65 million in 1936 to 22 million in 1960. The number of slash and longleaf pine available for gum production is at least 3½ times the number now being worked.

Declining trend in lumber production offset by increase in pulpwood cut. Lumber production dropped from a high of over 2 billion board feet in 1953 to less than a billion in 1961. Pulpwood production has risen from 700,000 cords in 1940 to almost 5 million in 1961.

The increase in softwood growth likely to level off. Conditions which have favored regeneration are not expected to continue. The area of idle and abandoned cropland has decreased sharply during the past 10 years. Openings formerly maintained by repeated burning have, with improved protection, pretty well restocked or have been taken over by shrubs and cull trees.

Net growth will remain well below potential unless forest management is intensified. Current growth is 42 cubic feet per acre. Prospective growth may be expected to level off at about 50 cubic feet during the next 30 years

with present trends in management. With management aimed at rotations that would supply the raw material needs of both sawmills and pulpmills, the potential is about 100 cubic feet per acre.

Many opportunities to increase growth. Georgia has about 9 million acres of land at least 40 percent stocked with desirable trees, but nearly two-thirds of this requires stand improvement to insure the future development and growth of desirable trees. Of the remainder, slightly over 12 million acres are suitable for growing pine, nearly one-third of which has no pine seed source and requires site preparation followed by planting. In addition, 1.3 million acres of idle and abandoned cropland and nearly a million acres of cutover forest land are available for planting without site preparation.

Opportunities greatest on farm woodlands. Farm woodlands offer the greatest opportunities to increase growth, but largely because of the area they represent rather than less favorable growing conditions. Farmers own over half of the commercial forest land. Growing conditions are only slightly less favorable on farmer-owned land than on forest-industry land and are equal to the average of all ownerships.

BETTER STOCKING

Along with the increase in forest area, there has been an improvement in stocking. In 1936, the average stand of all live trees 1.0 inch and larger averaged 49 square feet of basal area per acre. By 1953, this average had increased to 57 square feet, and by 1961 to 62 square feet.

Natural pine regeneration and planting have been sufficient to offset the natural encroachment of hardwoods following the cutting of pine stands (fig. 2). Pine trees still make up about 45 percent of the total stocking and about 55 percent of the growing-stock volume.

MORE TIMBER VOLUME

The increase in forest area and stocking has been accompanied by a substantial increase in volume. For Georgia as a whole, softwood growing-stock volume (volume in trees 5.0 inches and larger) has increased 19 percent and hardwood growing stock 26 percent during the past 25 years. Hardwoods have shown some leveling-off in the upward trend since 1953, but softwoods still show a rising trend (fig. 3).

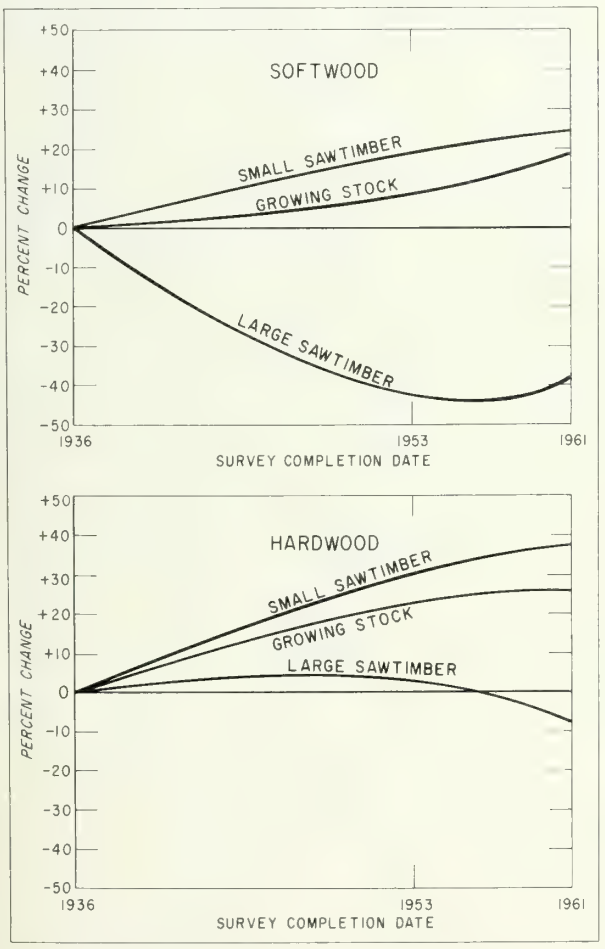


Figure 3. *Percent change in timber volume in Georgia since 1936.*

Changes in timber volume have not been uniform throughout the State. Softwood volume in the Coastal Plain, after making a substantial gain between 1936 and 1953, declined somewhat during the past 8 years. However, both softwood and hardwood volume is still substantially above the 1936 level. In the Piedmont, softwoods just about held their own between 1936 and 1953, but showed a sharp upward trend during the past 8 years. In the mountain area, softwood growing stock declined between 1936 and 1953, but since then this area has recovered practically all of the loss. Softwoods have increased, but hardwoods have shown little change.

TIMBER SMALLER BUT LESS DEFECTIVE

During the past 25 years, the average size of both softwood and hardwood timber in Georgia has decreased, which in turn has reduced the volume of high-quality timber available for lumber and veneer. In 1936, softwood timber in trees 15.0 inches and larger and of good enough quality to make saw logs comprised 27 percent of the total volume of growing stock, compared to 14 percent in 1961. Practically all of this shift in volume of softwood timber by size took place between 1936 and 1953. Since 1953, the distribution of volume by size class has remained about the same—thanks entirely to the recovery of large pine sawtimber volume in the lower Piedmont area. In other sections of the State, large sawtimber was still being overcut in 1961.

The average size of hardwood trees has also decreased. In 1936, 37 percent of the hardwood growing-stock volume was in large sawtimber (trees 15.0 inches and larger). By 1961, this had dropped to 27 percent. The volume in small sawtimber (trees 11.0 to 15.0) has not changed much, but large hardwood timber continues to be overcut.

The present lower tree quality is primarily a result of reduction in tree size. However, the young and vigorous stands building up in response to improved management practices and

fire protection are potentially of high quality. The improvement in turpentining along with the utilization of worked-out timber for pulpwood has nearly eliminated cull pine trees from the Coastal Plain stands. In the Piedmont area many old-field stands formerly stocked with scattered, excessively limby and short trees are now filling in with well-formed trees developing under forest conditions.

The examination of permanent plots throughout the State indicates an extremely high mortality rate for the poorer-quality timber, so that the chances are good the proportion of cull timber in today's stands is decreasing. If so, it is fortunate, for by present standards about 6 percent of the softwood and 26 percent of the hardwood basal area is in trees that will not make one merchantable 12-foot saw log now or prospectively. Most of these trees are not suitable for sawtimber because of defects such as excessive limbiness, crook, and sweep; trees which are cull because of rot account for only 4 percent of the total basal area.

Volume loss due to cull is decreasing. In 1961, the reduction in the gross cubic-foot volume of growing stock caused by rot was less than 1 percent for softwoods and only slightly more than 1 percent for hardwoods. The loss of board-foot volume amounts to 7 percent of the softwood gross board-foot volume and 9 percent of the hardwood board-foot volume.

Many of the older and larger hardwood trees still have the butt rot resulting from fire scars of past years. But these are either being cut or dying out and being replaced by vigorous, good-quality, young trees. Better fire protection has all but eliminated the butt scarring which in turn led to rot and such high losses of volume.

This increase in quality of young hardwoods has taken place mainly on the better hardwood growing sites. The picture is quite different on sites less well suited to growing hardwoods; here low-quality hardwoods with little or no saw-log quality potential have replaced pine over large areas following cutting. Most of these trees are slow-growing, have little market potential, and represent a poor utilization of the land.

TIMBER GROWING FASTER

In response to better stocking with younger and more vigorous trees, the net growth of softwoods has increased 42 percent since 1936 (fig. 4). The increase in softwood sawtimber growth has not been nearly so great—only 20 percent. Hardwood growth has increased also, but not so fast as softwood growth. Net growth increased 26 percent for hardwood growing stock and 23 percent for sawtimber. The trend in net growth is upward for both softwood and hardwood growing stock and for softwood sawtimber. Hardwood sawtimber growth shows a distinct leveling-off.

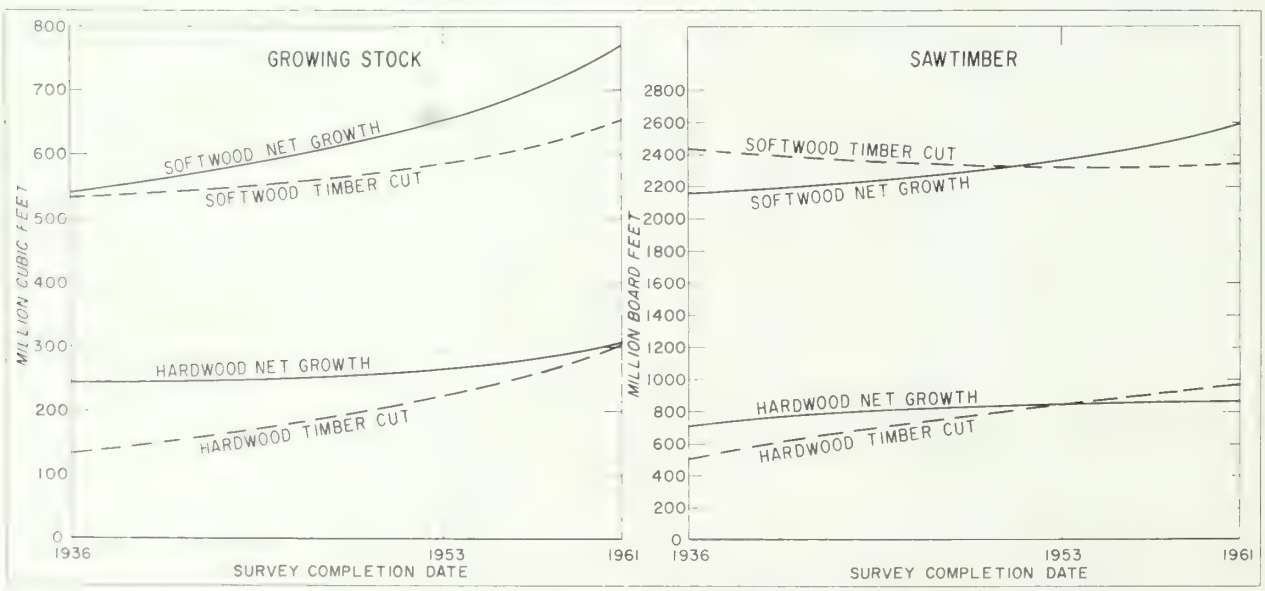


Figure 4. *Trend in net growth and timber cut in Georgia since 1936.*

MORE TIMBER CUT

Georgia's cut is increasing, but, for the State as a whole, softwood net growth is increasing faster than the cut (fig. 4). The same holds true for sawtimber; in 1936, timber cut exceeded net growth; by 1950, net growth balanced sawtimber cut, and by 1960 exceeded it.

The cut and growth relationship of hardwoods differs from that of softwoods in that timber is being cut faster than it grows. In 1936, the net growth of growing stock was almost double the timber cut. By 1960, net growth still exceeded the cut, but only by a narrow margin. As for sawtimber, the relationship shifted from an excess of growth over cut to more cut than growth in 1960.

MORE PULPWOOD, LESS SAW-LOG PRODUCTION

In 1937, Georgia's 1,607 sawmills dominated the State's forest industries. Since then, the trend has been toward fewer and larger mills. There are now only 527 sawmills, and their average annual production per mill has doubled since 1937 (fig. 5). During the period between the last two inventories, the number of wood-

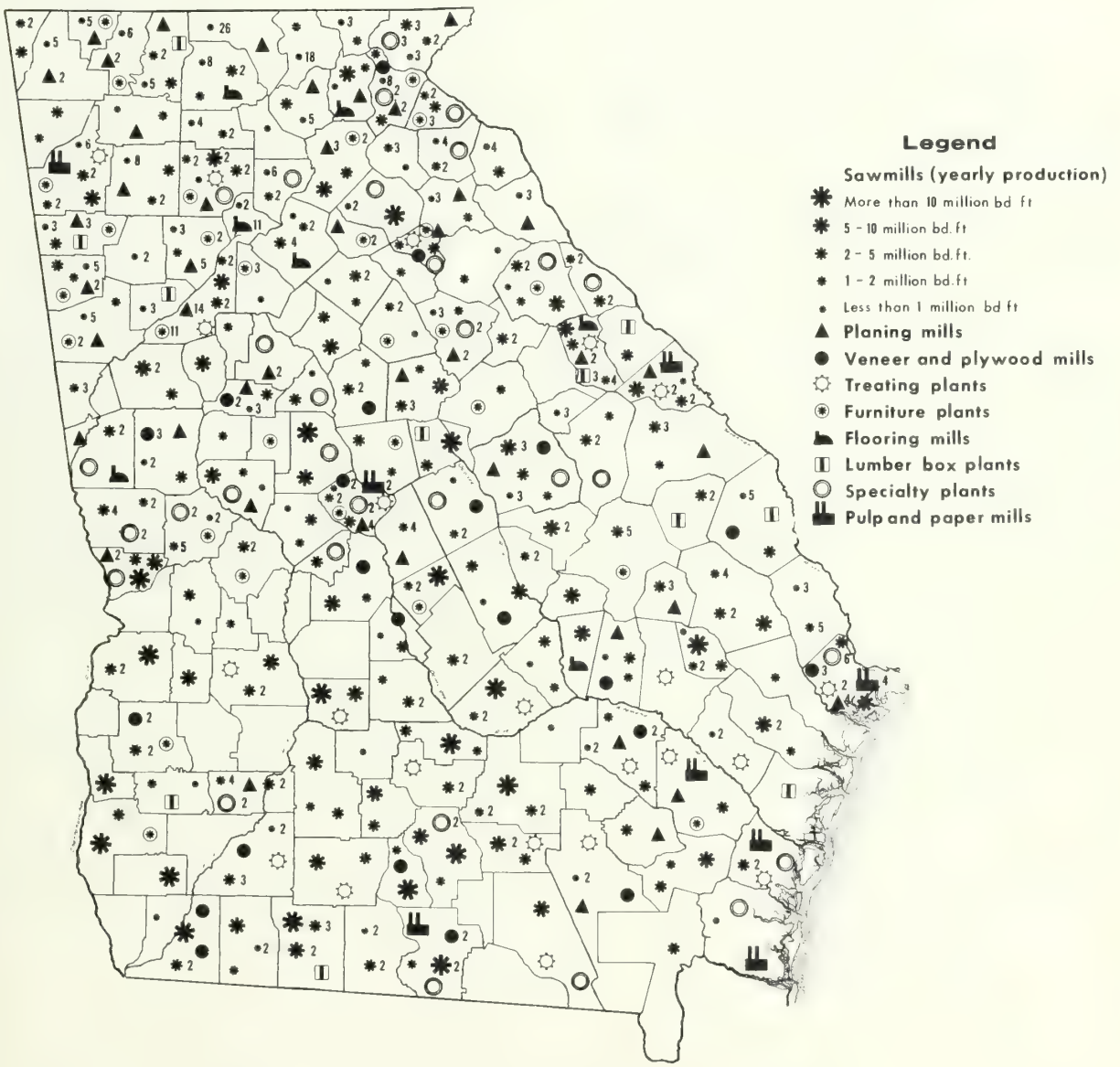


Figure 5. *Location of wood-using industries in Georgia, 1961.*

using pulpmills in Georgia has increased from 7 in 1952 to 12 in 1961. In addition, the average daily capacity of pulpmills has increased almost 40 percent since then. In 1952 daily capacity of pulpmills was 3,640 tons, or an average of 520 tons, while in 1961 daily capacity had increased to 8,693 tons, or an average of 724 tons per mill.

Lumber production has fluctuated widely from year to year. Current lumber production is about the same as it was in the middle thirties (fig. 6). Lumber production rose from about a billion board feet in 1936 to nearly two billion in 1942 and 1943 in response to the World War II demand. By 1945, production had dropped to 1.5 billion board feet, then rose to a high of 2.2 billion board feet in 1953. The present trend in reported lumber production is downward, reflecting in part the reduction in available supply of larger-size and better-quality timber.

This downward trend in lumber production has been more than offset by a marked increase in pulpwood production. Since 1940, pulpwood

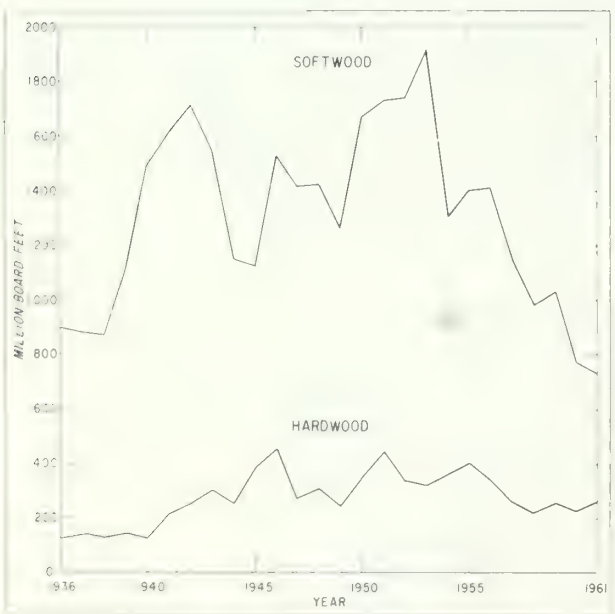


Figure 6. *Lumber production in Georgia, 1936 to 1961.*

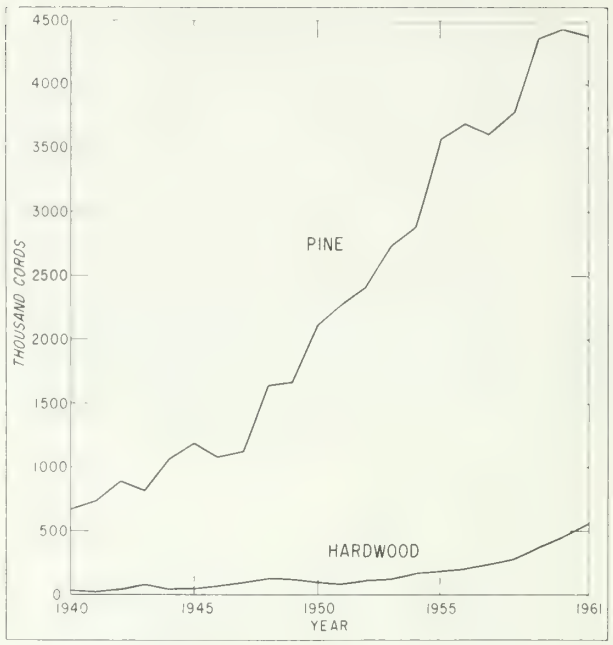


Figure 7. *Pulpwood production in Georgia, including residues, 1940 to 1961.*

production has risen from 700,000 cords to a current level of almost 5 million cords (fig. 7). During recent years there has been a greater use of hardwoods and plant residues. Although the cut from hardwoods has doubled since 1955, hardwood pulpwood production currently accounted for only 11 percent of the total. Increase in pulpwood production during the past 3 years has come from greater use of plant residues. The use of residues had increased to 11 percent of the total by 1961; since 1959, pulpwood production from roundwood has remained at 4.4 million cords.

Veneer plants—which account for a rather small part of the total cut—have increased only from 25 in 1936 to 27 in 1961. The number of treating plants, however, has increased from 6 in 1936 to 22 in 1961. The 36 stave plants that were reported in 1937 have all but disappeared from the scene, with only 3 reported in 1961. Following the sharp downward trend in number of households using wood for heating and cooking, the timber cut for fuelwood has also declined.

Georgia Pine - Source of Naval Stores

In addition to wood products, Georgia's timber is a leading source of turpentine and rosin. Gum collected from the scored faces of live longleaf and slash pine trees is the source of about one-fifth of the rosin and turpentine produced in the United States.

The volume of rosin and turpentine produced in the United States has changed little over the past 50 years, but the source of this production has shifted considerably. In 1936, when the first survey was completed, living slash and longleaf pine trees yielded almost all of the turpentine and rosin produced in the United States. In 1961, 54 percent of the rosin came from the distillation of stumpwood, 23 percent from the sulfate pulp process, and 23 percent from living pine trees. Fifty-two percent of the turpentine came from tall oil, 24 percent from stumps, and 24 percent from standing timber.

In 1960, 22 million trees in Georgia were being worked for gum as compared to 65 million trees in 1934 and 47 million in 1951. While the number of trees being worked has fallen off sharply, the supply of trees that could be worked has increased many times. The number of slash and longleaf pines available for gum production in Georgia is at least 3½ times the number now being worked. Current stumpwood production is only a fraction of the 13.8 million tons of operable stumps available. An additional 7.1 million tons of stumps will become operable when they can be removed without excessive damage to surrounding trees.

A substantial increase in the gum naval stores industry can be accomplished without the deterioration of timber values formerly associated with gum operations. Technical improvements have replaced old methods which, besides being wasteful, often left worked-out trees useless for other wood products. For the most part, such recently developed techniques as bark chipping with acid and the selection of harvest trees for chipping make possible a substantial buildup in gum naval stores without diminishing the usefulness of the worked-out timber for other products.

Timber Supply Outlook

During the past 25 years, conditions have been highly favorable to natural regeneration, rapid diameter growth, and low mortality. But conditions are changing. The area of idle and abandoned cropland is decreasing, leaving less land suitable for natural pine regeneration and planting. Stands are becoming more dense. Stand openings formerly created and maintained by cutting and wildfires are filling in either with growing stock or with cull trees and shrubs. Unless forest management is intensified, growth will not continue to rise at the present rate.

REGENERATION OUTLOOK

Changes in number of 2-inch saplings indicate that the regeneration rate for both softwoods and hardwoods has tripled during the past 25 years. The number of trees that survive to grow annually into the 2-inch diameter class (sapling ingrowth) has increased from 157 million softwood trees in 1936 to 440 million in 1960. The hardwood sapling ingrowth has increased from 193 million to 590 million. These increases in sapling ingrowth have accounted for a large part of the increase in net growth.

With the outlook for less and less abandoned cropland available for tree planting and less favorable conditions for natural regeneration on forest land, Georgia will have to rely more and more on costly site preparation followed by planting to maintain the regeneration rate.

Natural Regeneration

Future sapling ingrowth will continue to come mainly from natural regeneration. Further increases in the annual regeneration rate may be expected but at a somewhat slower rate than in the past as increasing stand density lowers the survival rate of seedlings. A projection of past trends, with allowances for increased seedling mortality, indicates that natural softwood sapling ingrowth will increase from the current 369 million trees to 652 million by 1990. Hardwood ingrowth may be expected to increase from 590 million to 1,023 million.

Ingrowth from Plantations

In the past, planting contributed very little to sapling ingrowth. For instance, in 1936, ingrowth from planted trees was negligible, and even by 1952, planted ingrowth accounted for only 4 percent of the total. But by 1960, plantations were contributing 71 million trees, or about 16 percent, to sapling ingrowth. This 1960 ingrowth, which consisted of survivors of the 118 million seedlings planted in 1955, still did not reflect recent large-scale planting. The peak planting of 375 million trees in 1958 will probably make up about a third of the total ingrowth in 1963.

That 1958 peak of planting has not been sustained in the last few years, and it seems likely the long-term average will be substantially

lower. Trees distributed for planting in Georgia since 1952 are:

Year	*Million seedlings*
1952	69
1953	96
1954	121
1955	118
1956	99
1957	201
1958	375
1959	316
1960	193
1961	118

In order to maintain the pine regeneration rate, it seems likely that planting should increase from the 1961 level of 118 million trees to a high of 234 million in 1980. After this, planting may decline to 212 million by 1990, as the opportunities for planting decrease and stand improvement needs increase. This planting level would result in nearly doubling ingrowth from planting over the next 30 years and serve to maintain the present planting proportion—about 16 percent of total ingrowth.

MORTALITY OUTLOOK

In 1960, natural destructive agents killed 3.5 percent of the softwood and 5.3 percent of the hardwood 2-inch saplings. In 4-inch saplings, the mortality rates are even higher—6.8 percent for both softwoods and hardwoods. Trees 5.0 inches and larger show much lower mortality rates, mainly because cutting tends to open up stands and prevent the overcrowding that kills so many smaller saplings. In this class, mortality rates of softwoods range from about 2 percent in 6-inch trees to about 0.75 percent of the inventory for large sawtimber. Hardwood rates are somewhat higher on the average. With continued fire protection, cutting nearly equal to growth, and a continuing shift of the cut to smaller sizes, chances are good that mortality rates will remain about as they are now.

LEVEL AND DISTRIBUTION OF CUT

The heaviest cutting is now taking place in the 14- to 18-inch timber, but as more timber is cut for pulpwood and less for saw logs, the smaller sizes will provide a greater share of the harvest. With a continuation of this trend, cutting may be more evenly distributed among all size classes by 1990.

Over the past 25 years, the margin between growth and cut has remained relatively narrow. Since the demand for timber products is rising, the difference between growth and cut will probably continue to be small.

AVAILABLE CUT

Under the assumption that the difference in the cut and growth will gradually diminish until growth equals cut by 1990, and assuming a continuation of the current trend in management, the prospective softwood cut available to forest industries may be expected to increase about 30 percent (fig. 8). This would mean that cutting would continue to increase about as it has for the past 10 years for another decade and then begin to level off. After 1980, net growth and the cut available from net growth would increase very little. Softwood timber available for saw logs in 1990 would increase a total of about 18 percent over 1960—two-thirds of this in large sawtimber and one-third in small sawtimber.

Hardwood growing stock also shows a prospective 30-percent increase in 30 years, but the cut available from large sawtimber would decrease if the trend to cut by diameter class is continued.

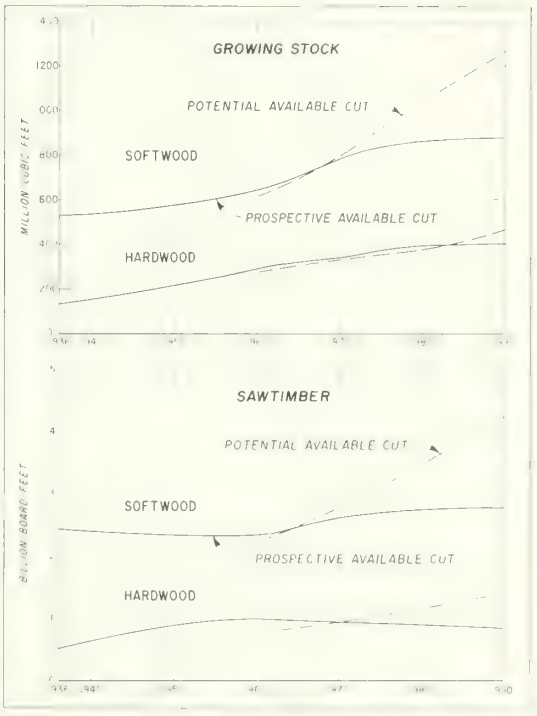


Figure 8. *Prospective and potential available cut, 1960-1990, Georgia.*

Timber-Growing Opportunities

GROWTH

In spite of the gains made over the past 25 years, opportunities to increase growth through better management and protection are numerous. Only 30 percent of Georgia's forest area is stocked with desirable trees—the kind of trees the land is capable of growing under good management (table II). Another 38 percent of the area is stocked with acceptable growing stock. These trees qualify as growing stock, but because of low vigor, high risk, too much rot or excessive forking and limbiness, they are not the kind of trees that will produce the highest volume and quality of products possible. Some 20 percent of the area is occupied by shrubs and cull trees, and another 12 percent is nonstocked.

Not only is the quality of trees far below the potential, but species composition of the stands is far out of balance. At least two-thirds of the land in Georgia is capable of growing pine, yet pine today accounts for only 45 percent of the basal area density. The potential growth of well managed, fully stocked pine stands is over 100 cubic feet per acre per year, compared to about 75 cubic feet for hardwood stands.

Intensive management practices which would result in full stocking of desirable trees, with two-thirds of the stocking in pine, would result in a potential net growth in all species of 100 cubic feet per acre, compared to the current growth of 42 cubic feet (table III). The potential board-foot growth per acre would be 340 board feet compared to the current growth of 135 board feet.

A management program that would achieve the above potential growth in 50 years would result in an available cut of growing stock 30 percent above the prospective cut by 1990 (fig. 9). The gain would be even greater for sawtimber—nearly a 60-percent increase over the prospective available cut by 1990.

Table II.—*Percent of area controlled by class of trees and vegetation, by land type and site, Georgia, 1961*

Land type and site	Growing stock		Cull trees	Shrubs	Non-stocked	Total
	Desirable	Other				
	Percent					
Pine stands:[1]						
Good	46	31	5	7	11	100
Average	41	33	8	6	12	100
Poor	34	28	8	14	16	100
All sites	44	31	6	8	11	100
Upland hardwoods:						
Good	25	35	9	13	18	100
Average	16	44	16	9	15	100
Poor	11	21	37	14	17	100
All sites	18	38	17	11	16	100
Lowland hardwoods:						
Good	21	54	11	9	5	100
Average	15	50	13	12	10	100
Poor	6	37	12	27	18	100
All sites	18	52	11	11	8	100
All land	30	38	11	9	12	100

[1] 40 percent or more stocked with pine.

Table III.—*Commercial forest area and net growth of growing stock per acre by land type and site, Georgia, 1961*

Land type and site	Area	Net growth per acre		
		Total	Softwood	Hardwood
	Million acres	*Cubic feet*		
Pine stands:[1]				
Good	6.8	60.1	55.5	4.6
Average	4.3	45.2	41.7	3.5
Poor	.6	35.3	34.5	.8
All sites	11.7	53.4	49.4	4.0
Upland hardwoods:				
Good	2.7	34.8	18.1	16.7
Average	5.2	25.1	10.0	15.1
Poor	1.1	12.3	8.0	4.3
All sites	9.0	26.5	12.2	14.3
Lowland hardwoods:				
Good	2.5	54.3	5.2	49.1
Average	2.5	30.2	5.0	25.2
Poor	.1	20.0	1.9	18.1
All sites	5.1	41.8	5.0	36.8
All land	25.8	41.7	27.6	14.1

[1] 40 percent or more stocked with pine.

STAND IMPROVEMENT

Nearly all the forest lands in Georgia offer opportunities to increase growth. Only 1.8 million acres are 70 percent or more stocked with desirable trees (condition class 1), and many of these are young stands that will require thinning before harvest time (table IV).

Table IV.—*Commercial forest area by land type, site, and area condition. Georgia, 1961*

Land type and site	Area condition class 1	2	3	4	5	6	All classes
	Million acres						
Pine stands:[1]							
Good	1.1	0.9	2.6	.	2.1	0.1	6.8
Average	.5	.5	1.6	.	1.6	.1	4.3
Poor	.	.1	.3	.	.2	.	.6
Total	1.6	1.5	4.5	.	3.9	.2	11.7
Upland hardwoods:							
Good	.1	.	.3	.	1.4	.9	2.7
Average	.	.1	.3	.	3.3	1.5	5.2
Poor	.	.	.		.4	.7	1.1
Total	.1	.1	.6	.	5.1	3.1	9.0
Lowland hardwoods:							
Good	.1	.	.4	.1	1.8	.1	2.5
Average	.	.	.2	.2	1.8	.3	2.5
Poor	.	.	.	.	.1	.	.1
Total	.1	.	.6	.3	3.7	.4	5.1
All land	1.8	1.6	5.7	.3	12.7	3.7	25.8

[1] 40 percent or more stocked with pine.

A third of the area, or 7.3 million acres, are between 40 and 70 percent stocked with desirable trees but only about a fourth of this area is expected to attain full stocking without treatment. The remaining 5.7 million acres require treatment to free the desirable trees from competition and overtopping.

Stands at least 40 percent stocked with pine offer the best opportunities for stand improvement; 4.5 million acres are at least 40 percent stocked with desirable trees but have at least 30 percent of the area occupied by competing low-quality trees and shrubs.

Upland hardwood stands offer far less opportunity for stand improvement. Out of a total of 9 million acres, less than a million acres have as much as 40-percent stocking with desirable trees. About 5 million acres are at least 40 percent stocked with growing stock; many of these stands, especially the 1.4 million acres on good sites, would probably justify stand improvement.

Georgia has, in addition to the upland and flatwood area, 5.1 million acres of lowland and riverbottoms. Only 18 percent of this area is

Nearly 4 million acres have virtually no growth potential at the present time and require rehabilitation to get them back into timber production.

About 9 million acres are at least 40 percent stocked with desirable trees, but nearly 6 million acres of this require removal of low-quality trees and shrubs to make room for the future growth and development of the desirable trees.

The 5 million acres of lowland sites are Georgia's main potential source of high-quality hardwoods. Today desirable trees stock only 18 percent of this area.

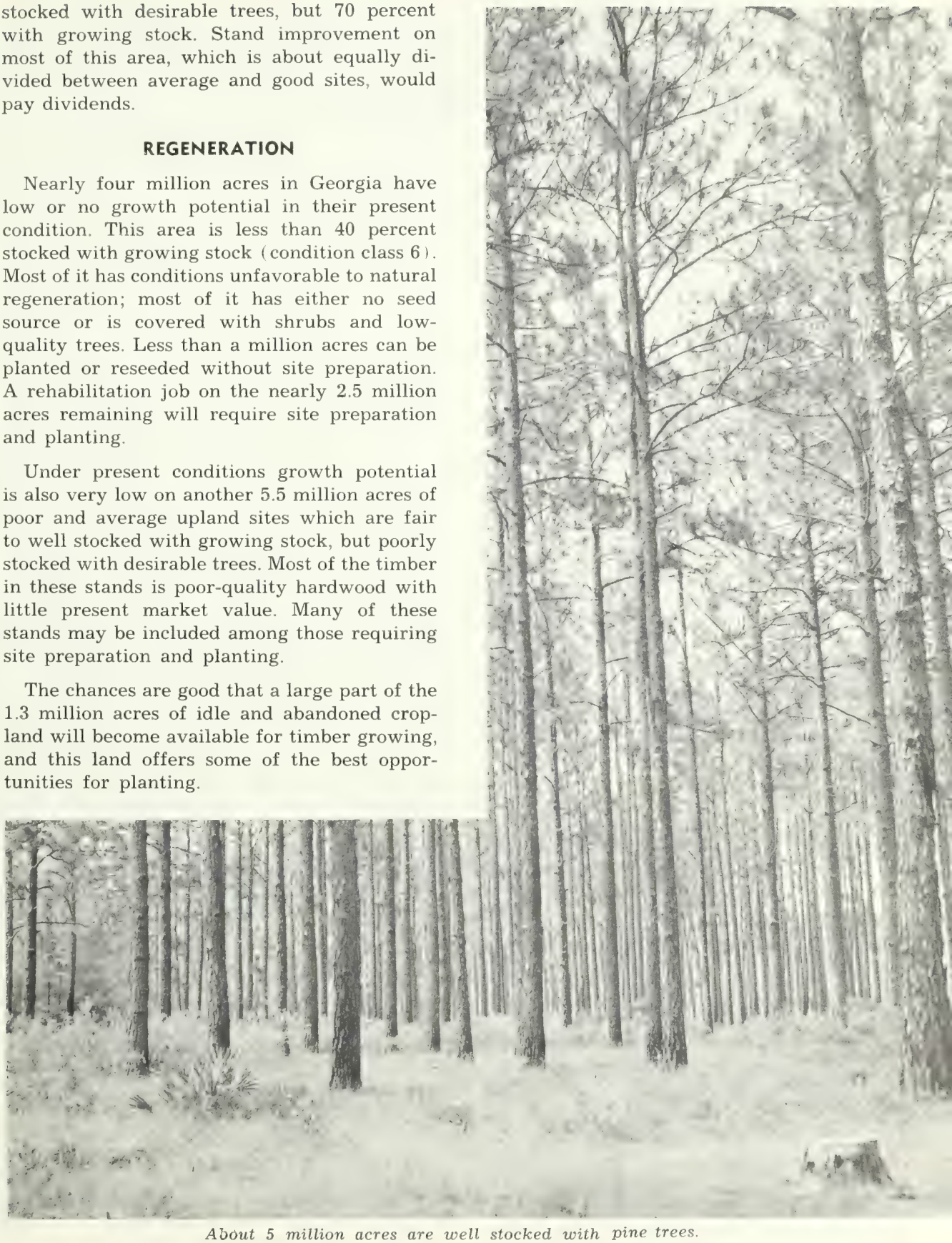
stocked with desirable trees, but 70 percent with growing stock. Stand improvement on most of this area, which is about equally divided between average and good sites, would pay dividends.

REGENERATION

Nearly four million acres in Georgia have low or no growth potential in their present condition. This area is less than 40 percent stocked with growing stock (condition class 6). Most of it has conditions unfavorable to natural regeneration; most of it has either no seed source or is covered with shrubs and low-quality trees. Less than a million acres can be planted or reseeded without site preparation. A rehabilitation job on the nearly 2.5 million acres remaining will require site preparation and planting.

Under present conditions growth potential is also very low on another 5.5 million acres of poor and average upland sites which are fair to well stocked with growing stock, but poorly stocked with desirable trees. Most of the timber in these stands is poor-quality hardwood with little present market value. Many of these stands may be included among those requiring site preparation and planting.

The chances are good that a large part of the 1.3 million acres of idle and abandoned cropland will become available for timber growing, and this land offers some of the best opportunities for planting.



About 5 million acres are well stocked with pine trees.

FORESTRY OUTLOOK

Nearly 200,000 people own 78 percent of the commercial forest land in Georgia. Over 170,000 of them are farmers owning on the average about 100 acres of woodland, and the rest are miscellaneous private owners.

Forest industries, mostly pulp companies, own 4 million acres, or 15 percent of the forest area (table V).

Public agencies such as National Forests, State, Department of Interior, and the Department of Defense, own a total of 2 million acres (7 percent).

Although productivity has improved in recent years, it is still far below potential on all classes of ownership. All ownerships are about two-thirds stocked with growing stock and about one-third stocked with desirable trees (table VI). The stocking of desirable trees on industrial forest land was only slightly better than on farmer-owned and miscellaneous private. Differences between stocking on public and private land reflect mainly differences in site potential and past use rather than current or recent management practices. While the stocking of growing stock for National Forests is considerably above the average, the species composition is far from ideal.

Table V.—*Area by land type, site class and ownership, Georgia, 1961*

Land type and site	All ownerships	Nat'l. Forest	Other public	Forest industry	Farmer-owned	Misc. private
			Thousand acres			
Pine stands:[1]						
Good	6,798	123	246	1,335	3,822	1,272
Average	4,303	94	145	635	2,504	925
Poor	626	4	50	125	284	163
Total	11,727	221	441	2,095	6,610	2,360
Upland hardwoods:						
Good	2,735	162	74	426	1,563	510
Average	5,168	339	150	596	3,068	1,015
Poor	1,100	41	61	152	558	288
Total	9,003	542	285	1,174	5,189	1,813
Lowland hardwoods:						
Good	2,440	10	183	375	1,458	414
Average	2,464		133	289	1,719	323
Poor	138		26	13	77	22
Total	5,042	10	342	677	3,254	759
All stands:						
Good	11,973	295	503	2,136	6,843	2,196
Average	11,935	433	428	1,520	7,291	2,263
Poor	1,864	45	137	290	919	473
Total	25,772	773	1,068	3,946	15,053	4,932

[1] 40 percent or more stocked with pine.

Table VI.—*Commercial forest land by owners and stocking class, Georgia, 1961*

Ownership	Stocking class					
	Growing stock		Cull trees	Shrubs	Non-stocked	Total
	Desirable	Other				
			Percent			
National Forest	18	62	12	5	3	100
Other public	24	38	9	16	13	100
Private farm	29	37	11	9	14	100
Forest industry	34	34	9	11	12	100
Other private	29	40	12	9	10	100
All ownerships	30	38	11	9	12	100

Of these three groups, clearly the first—the small private owners who control more than three-fourths of the State's commercial land—are the key to improving productivity. Owning an area that dwarfs that of industry and public agencies combined, these are the people who could most markedly increase the State's timber supply by adopting good forestry practices. Studies show that those who own 500 acres or upwards are more likely to be engaged in forestry than those with smaller woodland areas. Programs beamed at holders of the smaller acreages have to date left these people relatively untouched. These individuals are many, heterogeneous, and possessed of diverse viewpoints. Some of these owners would be willing to put time and money into forestry if they knew the earnings they could expect from planting, thinning, and handling timber as a crop. Some seem to be interested primarily in wildlife, a spot of wooded isolation and quiet, and a feeling for conservation and land stewardship. Many such owners are apprehensive about any kind of cutting, and do not know that good forestry can enhance the values they cherish while incidentally bringing in a small income.

Whatever the approach needed, the fact remains that for Georgia, a large state with a large share of the best timber-growing land in the South, forests are a pillar of the economy. Forestry benefits reach into every city and crossroads. Georgia has the land, the climate, and the progressive private companies and public agencies. But the State is realizing only half its timber-growing potential because its principal forest owners are not taking advantage of the opportunities offered by their woodlands.

Appendix

ACCURACY OF THE SURVEY

The data on forest acreage and timber volume in this report include estimates based on samples having an associated sampling error. A large enough sample is taken to keep the sampling error below a specified minimum for forest area and timber volume. Nonsampling errors, such as may arise from mistakes in judgment, measurement, recording, and compilation, are kept to a minimum through training, supervision, field check cruises, and complete editing and machine verification in compiling the data.

Estimates of forest area were based on the classification of 217,805 sample points systematically spaced on aerial photographs with a ground check of 11,796 of these points to adjust for changes in land use since date of photography. Estimates of volume and growth are based on measurements recorded at 8,876 of the ground check points classed as forest land. Estimates of timber products output are based on a canvass of wood-using industries made by the State in 1961.

Statistical analysis of the data indicates a sampling error of ±0.3 percent for the estimate of total forest area, 1.1 percent for total cubic volume, and 1.3 percent for total cubic volume growth. As these totals are broken down by forest type, species, tree diameter, and other subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the following tabulation, which shows the sampling error to which the estimates are liable, two chances out of three.

Forest area	Sampling error [1]	Cubic volume	Sampling error [1]	Net cu. ft. growth	Sampling error [1]
Thousand acres	*Percent*	*Million cu. ft.*	*Percent*	*Million cu. ft.*	*Percent*
25,772.2	0.3				
2,310.4	1.0	17,330.6	1.1	1,075.5	1.3
577.6	2.0	5,244.1	2.0	444.0	2.0
256.7	3.0	2,330.7	3.0	197.3	3.0
144.4	4.0	1,311.0	4.0	111.0	4.0
92.4	5.0	839.1	5.0	71.0	5.0
23.1	10.0	209.8	10.0	17.8	10.0
10.3	15.0	93.2	15.0	7.9	15.0
5.8	20.0	52.4	20.0	4.4	20.0
3.7	25.0	33.6	25.0	2.8	25.0

[1] By random-sampling formula.

HOW THE FOREST INVENTORY IS MADE

Forest statistics in Georgia were estimated by aerial photo interpretation with ground checks, remeasurements on plots established in the previous survey, and measurement of new plots. The detailed procedure was as follows:

1. From the most recent available aerial photography, every third photo was obtained in the flight lines most nearly coinciding with those used in the previous survey. Extra photos were also obtained if old forest plots fell between these photos or off the flight line. Preliminary estimates of the acreage of forest and other land-use classes were obtained by classifying grid points printed on the flight-line photos. No grid was printed on extra photos. The proportion of grid points falling in each land-use class provided the acreage estimates.

2. Enough old forest plots to meet established limits of error per billion cubic feet of timber were relocated on the new photos. When the new photographs showed that any of these old forest plots were now on nonforest land, all tally on such plots was recorded as timber cut and a replacement chosen. In counties with more old plots than were needed, the extra plots were deleted at random. If there were not enough old plots, new plots were added, using the grid points with the first new plot chosen at random and later ones at systematic intervals from the first. The photos, both old and new, and the old plot tally sheets were then sent to the field crews and they added additional new forest plots to insure sampling all ownership classes having 50 acres or more in each county, or to replace old plots which they were unable to find. Plots which were relocated but had to be shifted so that the entire plot would fall in the same stand size, forest type, and ownership were replaced by new plots for inventory and growth measurements; the mortality and cut data were, however, taken at the old location.

At both new and relocated sample areas the basic plot was a variable plot with a basal area factor of 10 square feet per acre. Timber volume, quality, and growth were tallied on this basic plot. Data on stocking, area condition, treatment needed, stand size, and disturbance were tallied on 20 sample points systematically established within the circular acre around plot center. At each point, stocking of pole and larger trees was tallied on a variable plot

with a basal area factor of 75 square feet per acre. Stocking of smaller trees and brush was recorded on concentric fixed-radius plots around the point center. The presence or absence of an acceptable seed source was also recorded at each point.

On relocated plots, all trees tallied as 4.0 inches d.b.h. and larger in the previous survey were accounted for. Missing trees were recorded as either cut or dead. On both relocated plots and new plots, trees which had been cut within the past 3 years or which died in the past year were tallied on three concentric plots of 1/100 acre, 1/50 acre, and 1/5 acre around the variable plot center. Cut and mortality were recorded only at the old location when plots were shifted, but when a lost plot was replaced by a new plot, the old tally was disregarded in recording cut and mortality. Trees deadened in stand improvement measures were included with cut. Cause of death was recorded for all tallied trees that had died of natural causes.

Except in southwest Georgia, where little change was anticipated, a tally of wood naval stores stumps was made on a 1/5-acre plot around the old plot center on each relocated old plot. Availability of wood naval stores stumps was recorded on a circular acre on all forest plots. Plots in nonforest land, systematically chosen to verify and adjust the area estimates based on the photo grid points, were also examined for availability of wood naval stores stumps.

3. Growth estimates were based on increment borings taken on all trees 4.0 inches d.b.h. and larger tallied on the base plot, except live oak. The breakdown of volume of timber cut by product was based on a 1960 production survey and on utilization studies. The breakdown of the cut and mortality by size was computed from the plot tally.

4. All field data were sent to Asheville for editing and were placed on punch cards for machine computing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

DEFINITIONS OF TERMS

Land-Use Classes

Forest land.—Areas of 1 acre or more at least 10 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use.

Commercial forest land.—Forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization.

Productive-reserved forest land. — Productive public forest land withdrawn from timber utilization through statute or administrative regulation.

Unproductive forest land.—Forest land incapable of yielding crops of industrial wood because of adverse site conditions.

Nonforest land.—Includes all land not qualifying as forest, water areas under 40 acres, and strips of water less than 660 feet wide. Also includes improved (graded) roads and railroads.

Cropland.—Nonforest land which has been cultivated within the past 2 years. Also includes tended orchards and yards of occupied farm homes. Excludes land being developed for permanent pasture even though it has been cultivated within the past 2 years.

Improved pasture.—Nonforest areas that are fenced, are less than 10 percent stocked with trees, and show evidence that an attempt is being made to maintain a sod of forage species.

Idle or abandoned cropland.—Includes cropland and orchards not cultivated or tended in the past 2 years, abandoned farm home sites, and nonforest land that no longer qualifies as improved pasture because of lack of maintenance.

Marsh or prairie.—Low, wet areas characterized by heavy growth of reeds and grasses without tree growth. Also includes upland meadows or prairies where timber does not grow naturally.

Urban and other.—Areas occupied by cities and towns, suburban areas developed for residential or industrial purposes, school yards, cemeteries, mines, quarries, airfields, roads, railroads, other cleared rights-of-way, and nonforested sand dunes and beaches. Excludes extensive areas of forested land within legal boundaries of cities and towns which have not been developed for other purposes and are available for production of timber. Includes town parks.

Ownership Classes

National Forest.—Includes Federally owned land within the boundaries of the National Forests.

Indian.—Tribal lands held in fee by the Federal Government but administered for Indian tribal groups and Indian trust.

Other Federal.—Includes military reservations, wildlife refuges, etc.

State.—Lands owned by states or leased by states for more than 50 years. Includes state forests, etc.

County and municipal.—Lands owned by counties or municipalities or leased by them for more than 50 years. Includes parks, watersheds, etc.

Pulp and paper companies.—Includes land owned in fee simple by pulp and paper companies. Excludes leased lands.

Other wood-using industries.—Includes land owned by all primary and secondary industries using wood as a raw material such as sawmills, veneer plants, handle mills, furniture factories, etc.

Farmer owned.—Includes land owned by persons who operate farms, either performing the labor themselves or directly supervising it, retired farmers or wives of farmers. To be classified as a farm, an area must be 10 or more acres and yield $50 or more annually from agricultural products or, if less than 10 acres, the yield must be at least $250

annually. Forest land owned by a farmer is classified as farmer-owned whether or not the particular tract contains an agricultural operation, unless the owner operates a forest industry. Lands leased by farm operators from owners such as railroads, states, and pulp companies are not to be considered farmer-owned lands.

Miscellaneous private.—All forest land not included under the above classification.

Stand-Size Class

Sawtimber stands.—Stands at least 10 percent stocked with growing-stock trees and with sawtimber trees making up a plurality of the stocking.

Poletimber stands.—Stands at least 10 percent stocked with growing-stock trees, and with poletimber trees making up a plurality of this stocking.

Sapling-seedling stands.—Stands at least 10 percent stocked with growing-stock trees, and with saplings and/or seedlings making up a plurality of this stocking.

Nonstocked areas.—Commercial forest lands less than 10 percent stocked with growing-stock trees.

Stocking

As a measure of area occupancy by tree quality, three categories of stocking are used by the Survey: (1) all live trees, (2) growing-stock trees, and (3) desirable trees. Stocking in terms of all trees is used in the delineation of forest land and forest types. Stocking in terms of growing-stock trees is used in stand-size and age classifications. Stocking in terms of desirable trees is used in classifying forest land by area-condition classes. The most dominant vegetation at each of the 20 points was recorded and formed the basis for determining plot stocking. The standards for 100 percent stocking are as follows: (1) 75 square feet of basal area per acre in trees 5.0 inches d.b.h. and larger, (2) 600 4-inch d.b.h. trees per acre, (3) 800 2-inch d.b.h. trees per acre, or (4) 1,000 established seedlings per acre.

Well stocked.—Areas 70 percent or better stocked with growing stock.

Medium stocked.—Areas 40-70 percent stocked with growing stock.

Poorly stocked.—Areas 10-40 percent stocked with growing stock. When there was a question whether an area had reverted to forest from another land use, the 10-percent minimum stocking was determined by another method. A count was made by size of all trees on the acre in which the plot fell, and a table used to determine exact stocking.

Nonstocked.—Areas less than 10 percent stocked with growing stock trees.

Forest Type Groups

White-red-jack pine.—Forests in which 50 percent or more of the stand is eastern white pine, red pine, or jack pine, singly or in combination. Common associates include hemlock, aspen, birch, and maple.

Loblolly-shortleaf pine.—Forests in which 50 percent or more of the stand is loblolly pine, shortleaf pine, or other southern yellow pines except longleaf or slash pine, singly or in combination. Common associates include oak, hickory, and gum.

Longleaf-slash pine.—Forests in which 50 percent or more of the stand is longleaf or slash pine, singly or in combination. Common associates include other southern pines, oak, and gum.

Oak-pine.—Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern pines make up 25-49 percent of the stand. Common associates include gum, hickory, and yellow-poplar.

Oak-hickory.—Forests in which 50 percent or more of the stand is upland oak or hickory, singly or in combination, except where pines comprise 25-49 percent, in which case the stand would be classified oak-pine. Common associates include yellow-poplar, elm, maple, and black walnut.

Oak-gum-cypress.—Bottomland forests in which 50 percent or more of the stand is tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, except where pines comprise 25-49 percent, in which case the stand would be classified oak-pine. Common associates include cottonwood, willow, ash, elm, hackberry, and maple.

Tree Species

Commercial species.—Tree species presently or prospectively suitable for industrial wood products; excludes so-called weed species, such as blackjack oak and blue beech.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Softwoods.—Coniferous trees, usually evergreen, having needle or scale-like leaves.

Site Quality Classes

Site classes represent a classification of forest land in terms of inherent capacity to grow crops of industrial wood.

Site indices for pine types were recorded in the field on a basis of the height-age relationship. On hardwood types where no pine was available, site was recorded in terms of the number of 16-foot saw logs that may be expected at maturity in the best hardwood tree in the area, i.e., 1-log, 2-log, 3-log, or better sites.

Based on these site indices, three site-quality classes are recognized. They are expressed in terms of the culmination of mean annual growth per acre of growing stock attainable in fully-stocked stands.

50 cubic feet per acre.—Longleaf pine and pond pine types of site index 60 or less; slash pine, loblolly pine, and oak-pine types of site index 50 or less; shortleaf pine types of site index 40; and

hardwood types of one log site or pine site index of 50 or less.

50-85 cubic feet per acre.—Longleaf pine and pond pine types of site index 70 or 80; slash pine types of site index 60; loblolly pine types and oak-pine types of site index 60 or 70; shortleaf pine types of site index 50 or 60; and hardwood types of two-log site or pine site index of 60 or 70.

85 or better cubic feet per acre.—Longleaf pine and pond pine types of site index 90 or better; loblolly pine and oak-pine types of site index 80 or better; slash pine and shortleaf pine types of site index 70 or better; and hardwood types of three-log site or pine site index of 80 or better.

Area Condition Classes

Class 1.—Areas 70 percent or more stocked with desirable trees.

Class 2.—Areas 40 to 70 percent stocked with desirable trees and with 30 percent or less of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 3.—Areas 40 to 70 percent stocked with desirable trees and with more than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 4.—Areas less than 40 percent stocked with desirable trees and with 30 percent or less of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 5.—Areas less than 40 percent stocked with desirable trees and with more than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface condition that will prevent occupancy by desirable trees. Growing stock stocking 40 percent or more.

Class 6.—Areas less than 40 percent stocked with desirable trees and with more than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees. Growing stock stocking less than 40 percent.

Class of Timber

Growing-stock trees.—Sawtimber trees, poletimber trees, saplings, and seedlings; that is, all live trees except cull trees.

Sawtimber trees.—Live trees of commercial species 9.0 inches and larger in diameter at breast height for softwoods and 11.0 inches and larger for hardwoods, and containing at least one saw log.

Poletimber trees.—Live trees of commercial species 5.0 to 9.0 inches in d.b.h. for softwoods and 5.0 to 11.0 inches for hardwoods, and of good form and vigor.

Seedlings and saplings.—Live trees of commercial species less than 5.0 inches in d.b.h. and of good form and vigor.

Desirable trees.—Growing-stock trees of high vigor and low risk that do not have defects that limit their present or potential use for high-quality timber products such as veneer logs and choice saw logs. Pines larger than 4.0 inches d.b.h. must have an annual radial growth of at least 0.08 inch and hardwoods at least 0.05 inch.

Desirable sawtimber trees.—Sawtimber trees which meet the following requirements:

1. Trees 15.0 inches d.b.h. or larger with at least 24 feet of saw-log portion with no more than 10 percent loss of board-foot volume due to rot, sweep, crook, or other defect. Trees less than 15.0 inches d.b.h. must have at least 16 feet of saw-log portion free of board-foot cull.
2. Softwood trees 15.0 inches d.b.h. or larger with one saw log 8 feet or longer qualifying as grade 2 or better. Softwood trees less than 15.0 inches with one log qualifying as grade 3 or better.
3. Trees that are vigorous and show no evidence of risk of mortality and have a complete crown of live limbs. Boles are neither hollow nor have an exposed rotten area over 4 inches wide. May include turpentined trees if no face has been idle or worked out as long as 5 years and no face has been burned.

Desirable large sapling and poletimber trees.—Trees 3.0 inches d.b.h. up to sawtimber size which meet the following specifications:

1. No stem defect which would prevent the tree having a 16-foot, cull-free saw log upon reaching sawtimber size.
2. A complete crown of live limbs.
3. A sound bole with no exposed rotten wood.
4. The site must be capable of producing desirable trees of the species in question.

Desirable seedlings and small saplings.—Trees of the following species less than 3.0 inches d.b.h. unless they are so obviously deformed and defective or are on such a poor site that they are not expected to develop into sawtimber:

Longleaf pine	Sweetgum
Slash pine	Basswood
Spruce pine	Cucumber
Loblolly pine	White oak
Shortleaf pine	Swamp chestnut oak
Pond pine	Northern red oak
White pine	Cherrybark oak
Cypress	Shumard oak
Water tupelo	Sugar maple
Blackgum (good bottomland sites only)	Yellow birch
Yellow-poplar	Black walnut

Acceptable trees.—Trees meeting the specifications for growing stock but not qualifying as desirable trees.

Sound cull trees.—Limited-use or rough live trees of sawtimber or poletimber size that are unmerchantable for saw logs now or prospectively because of excessive knots, sweep, crook, other sound defect, or because they are noncommercial species.

Rotten cull trees.—Live trees of sawtimber or poletimber size that are unmerchantable for saw logs now or prospectively because of rot. Also includes seedlings and saplings not expected to survive.

Salvable dead trees.—Standing or down dead trees that are considered currently or potentially merchantable.

Tree Grades

Tree grades are based on the log grade of the butt log graded according to standards presented by the U. S. Forest Service in "Interim Log Grades for Southern Pines," issued by the Southern Forest Experiment Station in 1953, and "Hardwood Log Grades for Standard Lumber," issued by the Forest Products Laboratory under the designation D1737 in 1949.

Hardwood log grades include, in addition to the hardwood log grades for standard lumber, a grade 4 tie and timber log. A grade 4 hardwood log must be sound internally (cannot have a rotten center), and no single knot or group of knots within a 6-inch section of the log can exceed one-third the log diameter at that point. Rotten defects or holes can be present on the surface of the log, but they must not extend more than 3 inches into the potential tie or timber. Sweep departure cannot exceed one-fourth the log scaling diameter per 8 feet of length.

Diameters

D.b.h. (Diameter breast high).—Tree diameter in inches, outside bark, measured at 4½ feet above ground.

Diameter classes.—The 2-inch diameter classes extend from 1.0 inch below to 0.9 inch above the stated midpoint. Thus, the 12-inch class includes trees 11.0 inches to and including 12.9 inches d.b.h.

Volume

Volume of sawtimber.—Net volume of the saw-log portion of live sawtimber trees, in board feet of the International rule, ¼-inch kerf.

Volume of growing stock.—Cubic-foot volume of sound wood in the bole of sawtimber and poletimber trees from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs. Similar volumes are given for cull trees.

Volume in cords.—Volume in standard cords of the same material shown in cubic feet except that bark is included.

International ¼-inch log rule.—A rule for estimating the board-foot volume of 4-foot log sections, according to the formula $V = 0.905\ (0.22D^2\text{-}0.71D)$. The taper allowance for computing the volume in log lengths greater than 4 feet is 0.5 inch per 4-foot section. Allowance for saw kerf is ¼ inch.

Cord.—The solid wood content, exclusive of bark, of a stacked pile 4 x 4 x 8 feet of round or split bolts. See "Conversion Factors" for cubic-foot content.

Growth and Timber Cut

Gross growth.—The growth on trees that were of volume size at the beginning of the year and the ingrowth resulting from smaller trees growing into volume size during the year.

Mortality.—The net volume in trees dying from natural causes during the year.

Net growth.—Gross growth minus mortality. When expressed in board feet, it represents the change during the calendar year in sawtimber volume resulting from growth, ingrowth, and mortality losses. When expressed in cubic feet or cords, it represents the change during the calendar year in the volume of all trees 5.0 inches and larger resulting from growth, ingrowth, and mortality losses.

Timber cut from sawtimber.—The net board-foot volume of live sawtimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber cut from growing stock.—The volume of sound wood in live sawtimber and poletimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber products.—Roundwood products and by-products of wood manufacturing plants.

Conversion Factors

Cubic feet of wood per average cord
(Excluding bark)

D.b.h.	Pine	Other softwoods	Hardwood
6	61.0	68.2	60.0
8	68.1	76.0	68.4
10	73.0	81.4	73.4
12	76.6	85.3	76.4
14	79.4	88.2	78.4
16	81.6	90.4	79.8
18	83.3	92.3	80.8
20	84.7	93.8	81.6
22	86.0	95.1	82.1
24	87.0	96.1	82.6
26	87.9	97.1	82.9
28	88.7	97.8	83.2
30	89.4	98.5	83.5
Average	71.3	81.5	72.6

INDEX TO DETAILED TABLES

Area

1. Area by land classes
2. Area of commercial forest land, by ownership classes
3. Area of commercial forest land, by stand-size and ownership classes
4. Area of commercial forest land, by stand-volume classes for sawtimber and other stand-size classes
5. Area of commercial forest land, by stocking classes based on alternative stand components
6. Area of commercial forest land, by stocking classes of growing-stock trees and by stand-size classes
7. Area of commercial forest land, by area-condition and ownership classes
8. Area of commercial forest land, by area-condition and stocking classes
9. Area of commercial forest land, by site and ownership classes
10. Area of commercial forest land, by forest types and ownership classes
11. Area of noncommercial forest land, by forest types

Volume

12. Number of growing-stock trees on commercial forest land, by diameter classes and by softwood and hardwood
13. Number of cull and salvable dead trees on commercial forest land, by diameter groups and by softwood and hardwood
14. Volume of timber on commercial forest land, by class and by softwood and hardwood
15. Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
16. Volume of growing stock and sawtimber on commercial forest land, by stand-size classes and by softwood and hardwood
17. Volume of growing stock on commercial forest land, by species and diameter classes
18. Volume of sawtimber on commercial forest land, by species and diameter classes
19. Volume of sawtimber on commercial forest land, by species and log grade
20. Volume of salvable dead sawtimber-size trees on commercial forest land, by softwood and hardwood

Growth, Cut, and Mortality

21. Net annual growth and annual cut of growing stock on commercial forest land, by species
22. Net annual growth and cut of growing stock on commercial forest land, by ownership classes and by softwood and hardwood
23. Net annual growth and cut of sawtimber on commercial forest land, by species
24. Net annual growth and cut of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
25. Annual mortality of growing stock and sawtimber on commercial forest land, by species
26. Annual mortality of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
27. Annual mortality of growing stock and sawtimber on commercial forest land, by causes and by softwood and hardwood

Utilization

28. Total output of timber products, by product, by type of material used, and by softwood and hardwood
29. Total output of roundwood products, by source and by softwood and hardwood
30. Annual timber cut from growing stock on commercial forest land, by product and logging residues, and by softwood and hardwood
31. Annual timber cut from live sawtimber on commercial forest land, by product and logging residues, and by softwood and hardwood
32. Volume of plant residues by industrial source and type of residue, and by softwood and hardwood

Projections

33. Timber growth projections

Supplemental Tables

34. Volume of timber by species group and timber quality
35. Commercial forest land, by area description and stocking class
36. Commercial forest land, by stocking class and ownership
37. Average net volume per acre on commercial forest land, by area description and species group
38. Average net volume and growth per acre on commercial forest land by ownership, tree class, and species group
39. Land area, by class, major forest type, and survey completion date
40. Volume of sawtimber and all timber, by species group, diameter class, and survey completion date
41. Volume of all timber, by species group, survey unit, and survey completion date
42. County area, by class
43. Commercial forest land, by county and ownership
44. Volume of sawtimber and all timber, by county and species group

Table 1. *Area by land classes, Georgia, 1961*

Land class	Area
	Thousand acres
Commercial forest land	25,772.2
Unproductive forest land	54.1
Productive-reserved forest land	13.1
Total forest land	25,839.4
Nonforest land [1]	11,543.3
All land [2]	37,382.7

[1] Includes 269,000 acres of water according to survey standards of area classification but defined by Bureau of the Census as land. Also includes 45,900 acres classified as water by the Bureau of the Census but as land by Forest Survey; and excludes 92,000 acres of Census water created since 1950.

[2] From U. S. Bureau of the Census, Land and Water Area of the United States, 1950.

Table 2. *Area of commercial forest land, by ownership classes, Georgia, 1961*

Ownership class	Area
	Thousand acres
National Forest	773.4
Other Federal:	
Bureau of Land Management	.
Indian	...
Miscellaneous Federal	932.4
Total other Federal	932.4
State	111.2
County and municipal	23.9
Forest industry:	
Pulp and paper	3,153.1
Other	793.3
Total forest industry	3,946.4
Farmer-owned	15,053.0
Miscellaneous private	4,931.9
All ownerships	25,772.2

Table 3. *Area of commercial forest land by stand-size and ownership classes, Georgia, 1961*

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
Sawtimber	8,592.2	472.1	450.5	1,331.2	6,338.4
Poletimber	4,720.8	161.6	178.0	724.7	3,656.5
Sapling and seedling	11,720.2	139.7	374.4	1,740.9	9,465.2
Nonstocked areas	739.0	.	64.6	149.6	524.8
All classes	25,772.2	773.4	1,067.5	3,946.4	19,984.9

Table 4. *Area of commercial forest land, by stand-volume classes for sawtimber and other stand-size classes, Georgia, 1961*

Stand volumes per acre	All stands	Sawtimber stands	Other stands
	Thousand acres		
Less than 1,500 board feet	16,343.4	2,220.1	14,123.3
1,500 to 5,000 board feet	6,520.7	3,722.3	2,798.4
More than 5,000 board feet	2,908.1	2,649.8	258.3
All classes	25,772.2	8,592.2	17,180.0

Table 5. *Area of commercial forest land, by stocking classes based on alternative stand components, Georgia, 1961*

Stocking percentage	Stocking classified in terms of —		
	All trees	Growing-stock trees	Desirable trees
	Thousand acres		
90 to 100	8,939.4	4,863.2	225.3
80 to 90	5,515.5	4,960.4	560.8
70 to 80	3,544.1	4,472.5	1,049.9
60 to 70	2,529.4	3,190.8	1,649.3
50 to 60	1,703.9	2,512.0	2,472.2
40 to 50	1,346.2	1,922.9	3,081.6
30 to 40	951.4	1,350.4	3,375.8
20 to 30	664.2	1,034.7	3,953.0
10 to 20	352.1	726.3	4,250.7
Less than 10	226.0	739.0	5,153.6
All areas	25,772.2	25,772.2	25,772.2

Table 6. *Area of commercial forest land, by stocking classes of growing-stock trees and by stand-size classes, Georgia, 1961*

Stocking class	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
	Thousand acres				
70 percent or more	14,296.1	5,495.1	2,847.2	5,953.8	.
40 to 70 percent	7,625.7	2,326.9	1,321.0	3,977.8	.
10 to 40 percent	3,111.4	770.2	552.6	1,788.6	.
Less than 10 percent	739.0	.	.	.	739.0
All classes	25,772.2	8,592.2	4,720.8	11,720.2	739.0

Table 7. *Area of commercial forest land, by area-condition and ownership classes, Georgia, 1961*

Area-condition class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
1	1,764.5	9.0	52.8	344.6	1,358.1
2	1,564.4	1.4	53.9	251.8	1,257.3
3	5,705.2	74.2	245.7	1,085.1	4,300.2
4	297.6	.	38.9	39.5	219.2
5	12,711.3	679.5	476.9	1,672.3	9,882.6
6	3,729.2	9.3	199.3	553.1	2,967.5
All classes	25,772.2	773.4	1,067.5	3,946.4	19,984.9

Table 8. *Area of commercial forest land, by area-condition and stocking classes, Georgia, 1961*

Area-condition class	All classes		Stocking class									
			Growing stock				Cull trees		Shrubs		Nonstocked	
			Desirable		Other							
	Thousand acres	*Percent*	*Thousand acres*	*Percent*	*Thousand acres*	*Percent*	*Thousand acres*	*Percent*	*Thousand acres*	*Percent*	*Thousand acres*	*Percent*
1	1,764.5	100.0	1,372.8	77.8	201.2	11.4	35.3	2.0	52.9	3.0	102.3	5.8
2	1,564.4	100.0	851.0	54.4	115.8	7.4	40.7	2.6	43.8	2.8	513.1	32.8
3	5,705.2	100.0	2,807.0	49.2	1,751.5	30.7	359.4	6.3	467.8	8.2	319.5	5.6
4	297.6	100.0	20.8	7.0	113.1	38.0	14.9	5.0	25.9	8.7	122.9	41.3
5	12,711.3	100.0	2,135.5	16.8	7,181.9	56.5	1,499.9	11.8	1,029.6	8.1	864.4	6.8
6	3,729.2	100.0	462.4	12.4	354.3	9.5	854.0	22.9	790.6	21.2	1,267.9	34.0
All classes	25,772.2	100.0	7,649.5	29.7	9,717.8	37.7	2,804.2	10.9	2,410.6	9 3	3,190.1	12.4

Table 9. *Area of commercial forest land, by site and ownership classes, Georgia, 1961*

Site class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
120 cu. ft. or more	2,376.9	53.5	104.5	495.2	1,723.7
85 to 120 cu. ft.	9,595.6	241.8	398.5	1,640.4	7,314.9
50 to 85 cu. ft.	11,935.7	433.5	428.0	1,520.4	9,553.8
Less than 50 cu. ft.	1,864.0	44.6	136.5	290.4	1,392.5
All classes	25,772.2	773.4	1,067.5	3,946.4	19,984.9

Table 10. *Area of commercial forest land, by forest types and ownership classes, Georgia, 1961*

Type	All ownerships	Public	Private
	Thousand acres		
Pine types:			
White pine	18.1	14.4	3.7
Longleaf pine	1,610.0	109.2	1,500.8
Slash pine	4,099.9	165.5	3,934.4
Loblolly pine	5,074.7	256.3	4,818.4
Shortleaf pine	1,735.3	97.4	1,637.9
Pond pine	304.5	19.5	285.0
Virginia pine	300.4	35.4	265.0
Total	13,142.9	697.7	12,445.2
Hardwood types:			
Oak-pine	3,639.9	289.2	3,350.7
Oak-hickory	3,947.6	502.1	3,445.5
Oak-gum-cypress	5,041.8	351.9	4,689.9
Total	12,629.3	1,143.2	11,486.1
All types	25,772.2	1,840.9	23,931.3

Table 11. *Area of noncommercial forest land, by forest types, Georgia, 1961*

Type	All areas	Productive-reserved areas	Unproductive areas
	Thousand acres		
Longleaf-slash pine	20.1	0.4	19.7
Loblolly-shortleaf pine	23.1	6 8	16.3
Oak-pine	11.5	1 8	9.7
Oak-hickory	5.6	3 4	2.2
Oak-gum-cypress	6.9	.7	6.2
All types	67.2	13.1	54.1

Table 12. *Number of growing-stock trees on commercial forest land, by diameter classes and by softwood and hardwood, Georgia, 1961*

D.b.h. class (inches)	All species	Softwood	Hardwood
	Thousand trees		
1.0-2.9	7,197,564	2,694,716	4,502,848
3.0-4.9	2,202,770	1,131,542	1,071,228
5.0-6.9	1,047,622	636,956	410,666
7.0-8.9	582,404	356,815	225,589
9.0-10.9	345,605	204,406	141,199
11.0-12.9	190,913	108,948	81,965
13.0-14.9	94,487	47,122	47,365
15.0-16.9	40,123	18,249	21,874
17.0-18.9	19,969	7,032	12,937
19.0-28.9	17,866	4,748	13,118
29.0-38.9	764	141	623
39.0 and larger	42	23	19
All classes	11,740,129	5,210,698	6,529,431

Table 13. *Number of cull and salvable dead trees on commercial forest land, by diameter groups and by softwood and hardwood, Georgia, 1961*

D.b.h. class (inches)	Cull trees	Salvable dead trees
	Thousand trees	
Softwood:		
5.0-8.9	28,226	1,736
9.0-18.9	16,553	306
19.0 and larger	321	3
Total	45,100	2,045
Hardwood:		
5.0-10.9	238,016	
11.0-18.9	36,387	
19.0 and larger	4,482	
Total	278,885	
All species	323,985	2,045

Table 14. *Volume of timber on commercial forest land, by class and by softwood and hardwood, Georgia, 1961*

Class of timber	All species	Softwood	Hardwood
		– – Million cubic feet – –	
Sawtimber trees:			
Saw-log portion	8,191.9	5,099.8	3,092.1
Upper-stem portion	2,686.6	1,397.2	1,289.4
Total	10,878.5	6,497.0	4,381.5
Poletimber trees	6,452.1	3,242.2	3,209.9
All growing-stock trees	17,330.6	9,739.2	7,591.4
Sound cull trees:			
Sawtimber-size trees	533.0	143.0	390.0
Poletimber-size trees	554.3	54.4	499.9
Total	1,087.3	197.4	889.9
Rotten cull trees:			
Sawtimber-size trees	333.7	30.0	303.7
Poletimber-size trees	130.2	9.2	121.0
Total	463.9	39.2	424.7
Salvable dead trees:			
Sawtimber-size trees	5.1	5.1	.
Poletimber-size trees	5.3	5.3	.
Total	10.4	10.4	.
Total, all timber	18,892.2	9,986.2	8,906.0

Table 15. *Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Georgia, 1961*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	– – – Million cubic feet – – –			*– – – Million board feet – – –*		
National Forest	867.4	325.6	541.8	2,865.7	1,177.3	1,688.4
Other public	816.2	595.9	220.3	2,752.6	2,209.3	543.3
Forest industry	2,882.1	1,842.8	1,039.3	8,132.4	5,375.5	2,756.9
Farmer and misc. private	12,764.9	6,974.9	5,790.0	34,261.0	19,619.9	14,641.1
All ownerships	17,330.6	9,739.2	7,591.4	48,011.7	28,382.0	19,629.7

Table 16. *Volume of growing stock and sawtimber on commercial forest land, by stand-size classes and by softwood and hardwood, Georgia, 1961*

Stand-size class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	– – – Million cubic feet – – –			*– – – Million board feet – – –*		
Sawtimber	10,580.0	5,886.5	4,693.5	35,231.1	20,820.4	14,410.7
Poletimber	3,378.9	1,837.0	1,541.9	5,217.8	2,808.9	2,408.9
Sapling and seedling	3,353.6	2,002.0	1,351.6	7,510.4	4,715.3	2,795.1
Nonstocked areas	18.1	13.7	4.4	52.4	37.4	15.0
All classes	17,330.6	9,739.2	7,591.4	48,011.7	28,382.0	19,629.7

Table 17. *Volume of growing stock on commercial forest land, by species and diameter classes, Georgia, 1961*

Species	Diameter class (inches at breast height)									
	All classes	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-28.9	29.0-38.9	39.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	1,169.0	84.4	233.6	326.4	255.7	159.0	64.8	25.9	19.2	.	.
Slash pine	2,402.2	292.7	507.9	593.9	470.5	270.7	151.5	64.9	50.1	.	.
Shortleaf pine	1,585.4	324.5	387.2	363.8	270.7	139.1	66.4	24.8	8.9	.	.
Loblolly pine	3,549.1	474.4	623.3	685.6	647.9	451.9	303.0	169.2	182.9	10.9	...
Other yellow pine	403.8	68.8	82.9	72.2	64.0	58.6	20.4	24.1	12.8	.	.
Eastern white pine	52.2	3.3	3.8	3.4	9.6	10.0	2.9	3.1	16.1	.	.
Eastern hemlock	7.6	.6	1.6	.7	.	1.5	.	.	1.7	1.5	.
Cypress	565.8	51.3	98.9	105.6	121.4	75.3	34.9	18.2	41.5	8.9	9.8
Other eastern softwoods	4.1	1.4	1.6	.4	.5	.2	.	.	.	.	.
Total	9,739.2	1,301.4	1,940.8	2,152.0	1,840.3	1,166.3	643.9	330.2	333.2	21.3	9.8
Hardwood:											
Select white oaks [1]	527.1	72.1	71.9	89.3	87.6	58.1	36.3	36.8	64.8	9.5	.7
Select red oaks [2]	260.7	21.3	22.3	34.9	42.8	38.3	21.7	32.7	39.4	7.3	.
Other white oaks	551.6	60.1	81.0	93.2	80.1	62.5	43.7	44.7	73.9	12.0	.4
Other red oaks	1,427.9	169.8	187.6	210.8	203.4	171.0	143.0	104.2	213.1	22.5	2.5
Hickory	522.4	57.2	69.9	79.8	77.4	68.9	61.8	36.7	68.2	1.7	.8
Yellow birch	2.0	.	.	1.5	.	.	.	.	.5	.	.
Hard maple	6.6	1.0	2.1	.9	.3	.7	.	.8	.8	.	.
Soft maple	414.8	55.3	72.6	79.2	62.6	50.6	27.7	28.6	36.7	1.5	.
Beech	37.9	1.6	.7	3.4	3.8	3.6	4.9	6.8	12.7	.4	.
Sweetgum	1,077.2	121.0	166.8	194.3	180.1	173.7	86.1	65.3	84.6	5.3	.
Tupelo and blackgum	1,424.0	128.8	204.2	274.3	271.5	235.9	142.1	72.6	89.0	5.6	.
Ash	228.5	29.3	35.7	41.6	37.6	33.1	14.8	15.0	21.4	.	.
Cottonwood	3.7	.	.	.	.	.	1.5	1.2	1.0	.	.
Basswood	7.5	1.5	1.4	.	2.0	1.0	.7	.	.9	.	..
Yellow-poplar	548.9	38.3	71.9	85.6	109.8	84.8	43.7	43.5	66.0	5.3	.
Black walnut	6.4	.2	.	2.1	1.3	.	1.1	.7	1.0	.	.
Other eastern hardwoods	544.2	76.9	89.4	107.1	83.1	66.1	52.3	32.6	33.4	3.3	.
Total	7,591.4	834.4	1,077.5	1,298.0	1,243.4	1,048.3	681.4	522.2	807.4	74.4	4.4
All species	17,330.6	2,135.8	3,018.3	3,450.0	3,083.7	2,214.6	1,325.3	852.4	1,140.6	95.7	14.2

[1] Includes white and swamp chestnut oaks.
[2] Includes cherrybark, Shumard, and northern red oaks.

Table 18. *Volume of sawtimber on commercial forest land, by species and diameter classes, Georgia, 1961*

Species	Diameter class (inches at breast height)								
	All classes	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-28.9	29.0-38.9	39.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	3,717.5	1,361.5	1,114.6	726.0	284.4	126.2	104.8	.	.
Slash pine	7,124.6	2,436.8	2,148.4	1,301.5	681.6	312.6	243.7	.	.
Shortleaf pine	3,745.2	1,365.3	1,192.1	673.1	334.5	129.2	51.0	.	.
Loblolly pine	10,707.6	2,377.3	2,724.9	2,115.7	1,529.0	911.0	994.6	55.1	.
Other yellow pine	1,050.3	254.7	265.6	263.6	88.6	112.7	65.1	.	.
Eastern white pine	231.3	13.3	43.6	45.4	16.0	18.6	94.4	.	.
Eastern hemlock	27.4	2.6	.	9.0	.	.	11.2	4.6	.
Cypress	1,773.9	329.5	505.7	364.6	178.1	88.9	234.1	37.6	35.4
Other eastern softwoods	4.2	.7	2.0	1.5	.	.	.	.	.
Total	28,382.0	8,141 7	7,996.9	5,500.4	3,112.2	1,699.2	1,798.9	97.3	35.4
Hardwood:									
Select white oaks [1]	1,373.7	.	381.5	273.5	166.6	170.7	328.8	49.0	3.6
Select red oaks [2]	940.5	.	189.6	189.7	125.6	162.5	220.6	52.5	.
Other white oaks	1,425.9	.	335.0	270.7	192.6	200.4	359.3	64 9	3.0
Other red oaks	4,157.9	.	867.0	794.6	700.6	528.2	1,119.2	139.8	8.5
Hickory	1,528.1	.	325.9	308.9	310.1	174.2	390.5	10.4	8.1
Yellow birch	1.8	.	.	.	.	.	1.8	.	.
Hard maple	12.6	.	1.9	3.5	.	3.8	3.4	.	.
Soft maple	831.4	.	214.7	188.8	130.6	117.9	170.9	8.5	.
Beech	134.5	.	13.1	15.1	18.8	28.9	55.8	2.8	.
Sweetgum	2,543.5	.	665.6	718.9	410.1	300.0	425.3	23.6	.
Tupelo and blackgum	3,232.8	.	968.5	933.6	589.8	310.2	410.6	20.1	.
Ash	569.3	.	156.5	152.6	76.7	74.2	109.3	.	.
Cottonwood	21.9	.	.	.	7.7	7.2	7.0	.	.
Basswood	20.0	.	9.0	3.3	3.4	.	4.3	.	.
Yellow-poplar	1,614.6	.	445.5	371.6	221.2	210.9	338.8	26.6	.
Black walnut	17 1	.	5.0	.	3.1	2.6	6.4	.	.
Other eastern hardwoods	1,204.1	.	337.3	285.9	249.6	154.7	159.3	17.3	.
Total	19,629.7	.	4,916.1	4,510.7	3,206.5	2,446.4	4,111.3	415.5	23.2
All species	48,011.7	8,141.7	12,913.0	10,011.1	6,318.7	4,145.6	5,910.2	512.8	58.6

[1] Includes white and swamp chestnut oaks.
[2] Includes cherrybark, Shumard, and northern red oaks.

Table 19. *Volume of sawtimber on commercial forest land, by species and log grade, Georgia, 1961*

Species	All grades	Grade 1 logs	Grade 2 logs	Grade 3 logs	Grade 4 logs
			Million board feet		
Softwood:					
Yellow pines	26,345.2	719.5	6,488.6	18,333.2	803.9
Eastern white pine	231.3	20.2	35.6	172.2	3.3
Cypress	1,773.9	175.4	502.2	1,076.0	20.3
Other eastern softwoods	31.6	.5	21.5	8.4	1.2
Total	28,382.0	915.6	7,047.9	19,589.8	828.7
Hardwood:					
Select white and red oaks	2,314.2	306.7	576.4	1,068.3	362.8
Other white and red oaks	5,583.8	438.7	1,187.5	2,594.0	1,363.6
Hickory	1,528.1	206.4	422.9	618.9	279.9
Yellow birch	1.8	..	1.3	.3	.2
Hard maple	12.6	.	.	9.4	3.2
Sweetgum	2,543.5	162.2	637.6	1,237.3	506.4
Ash, walnut, and black cherry	597.4	46.3	156.0	310.7	84.4
Yellow-poplar	1,614.6	162.3	395.4	727.4	329.5
Other hardwoods	5,433.7	379.4	1,404.8	2,532.0	1,117.5
Total	19,629.7	1,702.0	4,781.9	9,098.3	4,047.5
All species	48,011.7	2,617.6	11,829.8	28,688.1	4,876.2

Table 20. *Volume of salvable dead sawtimber-size trees on commercial forest land, by softwood and hardwood, Georgia, 1961*

Species group	Volume
	Million board feet
Softwood	21.7
Hardwood	.
All species	21.7

Table 21. *Net annual growth and annual cut of growing stock on commercial forest land, by species, Georgia, 1960*

Species	Net annual growth	Annual timber cut [1]
	Million cubic feet	
Softwood:		
Yellow pines	747.5	639.9
Eastern white pine	4.3	.4
Cypress	14.9	15.5
Other eastern softwoods	.6	.2
Total	767.3	656.0
Hardwood:		
Select white and red oaks	34.4	26.2
Other white and red oaks	75.5	68.7
Hickory	13.0	7.3
Yellow birch	.1	.2
Hard maple	.1	.2
Sweetgum	63.6	64.8
Ash, walnut, and black cherry	6.8	6.1
Yellow-poplar	36.2	34.6
Other hardwoods	78.5	93.8
Total	308.2	301.9
All species	1,075.5	957.9

[1] Annual cut based on trend level between 1952 and 1960 as developed from the remeasurement of permanent sample plots.

Table 22. *Net annual growth and cut of growing stock on commercial forest land, by ownership classes and by softwood and hardwood, Georgia, 1960*

Ownership class	Net annual growth			Annual timber cut [1]		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
			Million cubic feet			
National Forest	29.8	17.6	12.2	9.5	4.2	5.3
Other public	33.0	24.8	8.2	25.3	17.9	7.4
Forest industry	185.3	145.6	39.7	145.0	97.9	47.1
Farmer and misc. private	827.4	579.3	248.1	778.1	536.0	242.1
All ownerships	1,075.5	767.3	308.2	957.9	656.0	301.9

[1] Annual cut based on trend level between 1952 and 1960 as developed from the remeasurement of permanent sample plots.

Table 23. *Net annual growth and cut of sawtimber on commercial forest land, by species, Georgia, 1960*

Species	Net annual growth	Annual timber cut [1]
	Million board feet	
Softwood:		
Yellow pines	2,529.7	2,275.9
Eastern white pine	15.3	1.6
Cypress	48.0	68.0
Other eastern softwoods	1.0	.5
Total	2,594.0	2,346.0
Hardwood:		
Select white and red oaks	96.6	78.7
Other white and red oaks	231.8	201.1
Hickory	38.1	17.9
Yellow birch	.	1.0
Hard maple	.3	.8
Sweetgum	136.1	221.2
Ash, walnut, and black cherry	21.2	19.5
Yellow-poplar	105.3	139.0
Other hardwoods	245.6	292.8
Total	875.0	972.0
All species	3,469.0	3,318.0

[1] Annual cut based on trend level between 1952 and 1960 as developed from the remeasurement of permanent sample plots.

Table 24. *Net annual growth and cut of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Georgia, 1960*

Ownership class	Net annual growth			Annual timber cut [1]		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million board feet					
National Forest	90.9	69.1	21.8	36.6	17.5	19.1
Other public	101.8	80.3	21.5	85.5	71.6	13.9
Forest industry	596.7	514.7	82.0	534.0	385.3	148.7
Farmer and misc. private	2,679.6	1,929.9	749.7	2,661.9	1,871.6	790.3
All ownerships	3,469.0	2,594.0	875.0	3,318.0	2,346.0	972.0

[1] Annual cut based on trend level between 1952 and 1960 as developed from the remeasurement of permanent sample plots.

Table 25. *Annual mortality [1] of growing stock and sawtimber on commercial forest land, by species, Georgia, 1960*

Species	Growing stock	Sawtimber
	Million cubic feet	*Million board feet*
Softwood:		
Yellow pines	97.2	200.1
Eastern white pine	.2	.5
Cypress	5.7	16.0
Other eastern softwoods	.1	.4
Total	103.2	217.0
Hardwood:		
Select white and red oaks	6.2	21.5
Other white and red oaks	29.5	77.7
Hickory	5.2	18.8
Yellow birch	.	.
Hard maple	.1	.
Sweetgum	9.2	20.6
Ash, walnut, and black cherry	4.5	9.8
Yellow-poplar	5.0	15.5
Other hardwoods	29.3	59.1
Total	89.0	223.0
All species	192.2	440.0

[1] Average annual mortality between 1952 and 1960 from the remeasurement of permanent sample plots.

Table 26. *Annual mortality [1] of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Georgia, 1960*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
National Forest	9.7	2.6	7.1	36.0	6.0	30.0
Other public	12.2	8.4	3.8	35.5	26.7	8.8
Forest industry	25.8	14.6	11.2	67.2	32.1	35.1
Farmer and misc. private	144.5	77.6	66.9	301.3	152.2	149.1
All ownerships	192.2	103.2	89.0	440.0	217.0	223.0

[1] Average annual mortality between 1952 and 1960 from the remeasurement of permanent sample plots.

Table 27. *Annual mortality [1] of growing stock and sawtimber on commercial forest land, by causes and by softwood and hardwood, Georgia, 1960*

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
Fire	22.5	19.6	2.9	39.6	33.8	5.8
Insects	16.0	10.4	5.6	52.6	27.7	24.9
Disease	9.6	6.7	2.9	21.8	13.6	8.2
Other	43.3	26.8	16.5	89.0	46.7	42.3
Unknown	100.8	39.7	61.1	237.0	95.2	141.8
All causes	192.2	103.2	89.0	440.0	217.0	223.0

[1] Average annual mortality between 1952 and 1960 from the remeasurement of permanent sample plots.

Table 28. *Total output of timber products, by product, by type of material used, and by softwood and hardwood, Georgia, 1961* [1]

Product and species group	Total output in standard units		Output from roundwood		Output from plant byproducts
	Unit	*Number*	*Standard units*	*M cubic feet*	*Standard units*
Saw logs:					
Softwood	M bd. ft.	995,187	995,187	174,594	
Hardwood	M bd. ft.	261,272	261,272	41,804	
Total	M bd. ft.	1,256,459	1,256,459	216,398	
Veneer logs and bolts:					
Softwood	M bd. ft.	430	430	66	
Hardwood	M bd. ft.	118,281	118,281	17,922	
Total	M bd. ft.	118,711	118,711	17,988	
Cooperage logs and bolts:					
Softwood	M bd. ft.				
Hardwood	M bd. ft.	2,825	2,825	452	
Total	M bd. ft.	2,825	2,825	452	
Pulpwood:					
Softwood	Std. cords [2]	4,387,521	3,923,858	265,844	463,663
Hardwood	Std. cords [2]	561,565	482,152	36,683	79,413
Total	Std. cords [2]	4,949,086	4,406,010	302,527	543,076
Piling:					
Softwood	M linear ft.	648	648	437	
Hardwood	M linear ft.				
Total	M linear ft.	648	648	437	
Poles:					
Softwood	M pieces	558	558	8,196	
Hardwood	M pieces				
Total	M pieces	558	558	8,196	
Misc. industrial wood: [3]					
Softwood	M cu. ft.	224	220	220	4
Hardwood	M cu. ft.	1,526	1,253	1,253	273
Total	M cu. ft.	1,750	1,473	1,473	277
Posts (round and split):					
Softwood	M pieces	2,992	2,992	1,316	
Hardwood	M pieces	122	122	53	
Total	M pieces	3,114	3,114	1,369	
Fuelwood: [4]					
Softwood	Std. cords	274,191	219,353	15,508	54,838
Hardwood	Std. cords	380,310	305,009	20,405	75,301
Total	Std. cords	654,501	524,362	35,913	130,139
All products:					
Softwood	M cu. ft.			466,181	
Hardwood	M cu. ft.			118,572	
Total	M cu. ft.			584,753	

[1] Based on 1961 state commodity drain survey.
[2] Rough wood basis.
[3] Includes excelsior bolts, turnery bolts, etc.
[4] Used for domestic heating and cooking; excludes industrial use.

Table 29. *Total output of roundwood products, by source and by softwood and hardwood, Georgia, 1961*

Source	All species	Softwood	Hardwood
	– – *Thousand cubic feet* – –		
Growing-stock trees: [1]			
Sawtimber trees	363,306	272,969	90,337
Poletimber trees	106,615	101,892	4,723
Material left after logging [2]	63,552	57,359	6,193
Total	533,473	432,220	101,253
Cull trees [1]	21,148	7,030	14,118
Salvable dead trees [1]	4,201	1,752	2,449
Other sources [3]	25,931	25,179	752
All sources	584,753	466,181	118,572

[1] On commercial forest land.
[2] Material from growing stock trees left after cutting for a specific product, but subsequently removed for other products.
[3] Includes trees less than 5.0 inches in diameter, and treetops and limbs.

Table 30. *Annual timber cut* [1] *from growing stock on commercial forest land, by product and logging residues, and by softwood and hardwood, Georgia, 1961*

Product and residues	All species	Softwood	Hardwood
	– – *Thousand cubic feet* – –		
Roundwood products:			
Saw logs	209,110	171,298	37,812
Veneer logs and bolts	17,545	61	17,484
Cooperage logs and bolts	452		452
Pulpwood	272,877	241,135	31,742
Piling	437	437	
Poles	8,119	8,119	
Misc. industrial wood	1,397	208	1,189
Posts	854	821	33
Fuelwood	14,597	7,278	7,319
All products	525,388	429,357	96,031
Logging residues	80,485	21,036	59,449
Timber cut	605,873	450,393	155,480

[1] Timber cut based on estimates of timber products output in 1961, by product.

Table 31. *Annual timber cut [1] from live sawtimber on commercial forest land, by product and logging residues, and by softwood and hardwood, Georgia, 1961*

Product and residues	All species	Softwood	Hardwood
		Thousand board feet	
Roundwood products:			
Saw logs	1,138,400	912,791	225,609
Veneer logs and bolts	115,809	405	115,404
Cooperage logs and bolts	2,848		2,848
Pulpwood	671,644	454,529	217,115
Piling	2,050	2,050	
Poles	45,782	45,782	
Misc. industrial wood	4,112	484	3,628
Posts	837	804	33
Fuelwood	2,623		2,623
All products	1,984,105	1,416,845	567,260
Logging residues	84,888	27,273	57,615
Timber cut	2,068,993	1,444,118	624,875

[1] Timber cut based on estimates of timber products output in 1961, by product.

Table 32. *Volume of plant residues, by industrial source and type of residue, and by softwood and hardwood, Georgia, 1961*

Industrial source	All species			Softwood			Hardwood		
	Total	Coarse [1]	Fine [2]	Total	Coarse [1]	Fine [2]	Total	Coarse [1]	Fine [2]
				Thousand cubic feet					
Lumber industry	82,440	15,406	67,034	62,232	8,832	53,400	20,208	6,574	13,634
Veneer and plywood industry	6,032	5,639	393	32	31	1	6,000	5,608	392
Other primary industries	2,870	1,147	1,723	1,688	642	1,046	1,182	505	677
All industries	91,342	22,192	69,150	63,952	9,505	54,447	27,390	12,687	14,703

[1] Unused material suitable for chipping, such as slabs, edgings, and veneer cores.
[2] Unused material not suitable for chipping, such as sawdust and shavings.

Table 33. *Timber growth projections, Georgia, 1960 to 1990*

Period	Assumed cut			Projected growth		
	All species	Softwood	Hardwood	All Species	Softwood	Hardwood
	GROWING STOCK					
	Thousand cubic feet					
1960 (year of inventory)	957,900	656,000	301,900	1,075,500	767,300	308,200
1970 (plus 10 years)	1,121,700	780,400	341,300	1,206,100	859,100	347,000
1980 (plus 20 years)	1,240,000	862,000	378,000	1,282,300	901,500	380,800
1990 (plus 30 years)	1,277,700	876,300	401,400	1,277,900	876,400	401,500
	SAWTIMBER					
	Thousand board feet					
1960 (year of inventory)	3,318,000	2,346,000	972,000	3,469,000	2,594,000	875,000
1970 (plus 10 years)	3,537,000	2,607,000	930,000	3,718,000	2,892,000	826,000
1980 (plus 20 years)	3,647,000	2,751,000	896,000	3,792,000	3,011,000	781,000
1990 (plus 30 years)	3,611,000	2,774,000	837,000	3,755,000	3,007,000	748,000

[1] Based on the assumption that cut starting at the 1960 level will be in balance with the growth by the year 1990, and that forestry progress will continue at the rate indicated by recent trends.

Table 34. *Volume of timber by species group and timber quality, Georgia, 1961*

Species group	Timber quality				
	Growing stock			Cull trees	All timber
	Desirable	Other	Total		
	Million cubic feet				
Softwood	3,901.5	5,837.7	9,739.2	236.6	9,975.8
Hardwood	1,779.5	5,811.9	7,591.4	1,314.6	8,906.0
Total	5,681.0	11,649.6	17,330.6	1,551.2	18,881.8

Table 35. *Commercial forest land, by area description and stocking class, Georgia, 1961*

Area description	All classes	Growing stock		Cull trees	Shrubs	Non-stocked
		Desirable	Other			
	Thousand acres					
Uplands and flatwoods:						
Pine stocking						
40 percent or more						
Good sites	6,798.1	3,153.7	2,071.7	347.7	493.5	731.5
Average sites	4,303.4	1,771.5	1,415.7	335.0	281.4	499.8
Poor sites	626.3	215.1	175.0	49.0	88.0	99.2
All sites	11,727.8	5,140.3	3,662.4	731.7	862.9	1,330.5
Less than 40 percent						
Good sites	2,734.6	677.9	957.2	247.6	360.4	491.5
Average sites	5,168.4	801.7	2,261.8	840.0	470.4	794.5
Poor sites	1,099.6	124.6	226.1	402.1	159.9	186.9
All sites	9,002.6	1,604.2	3,445.1	1,489.7	990.7	1,472.9
Total uplands	20,730.4	6,744.5	7,107.5	2,221.4	1,853.6	2,803.4
Lowlands:						
Good sites	2,439.8	522.6	1,321.8	255.0	216.3	124.1
Average sites	2,463.9	373.8	1,238.3	310.8	302.9	238.1
Poor sites	138.1	8.6	50.2	17.0	37.8	24.5
All sites	5,041.8	905.0	2,610.3	582.8	557.0	386.7
All areas	25,772.2	7,649.5	9,717.8	2,804.2	2,410.6	3,190.1

Table 36. *Commercial forest land, by stocking class and ownership, Georgia, 1961*

Stocking class	All ownerships	National Forest	Other public	Forest industry	Farmer-owned	Misc. private
	Thousand acres					
Desirable trees:						
Pine	6,008.7	77.3	221.0	1,109.0	3,457.3	1,144.1
Other	1,640.8	64.9	38.7	238.0	995.1	304.1
Total	7,649.5	142.2	259.7	1,347.0	4,452.4	1,448.2
Other:						
Pine	3,086.4	124.6	131.9	487.4	1,682.0	660.5
Other	6,631.4	355.0	266.4	825.0	3,869.2	1,315.8
Total	9,717.8	479.6	398.3	1,312.4	5,551.2	1,976.3
Cull treees:						
Pine	294.9	5.6	8.0	37.7	185.0	58.6
Other	2,509.3	87.7	86.1	326.5	1,504.4	504.6
Total	2,804.2	93.3	94.1	364.2	1,689.4	563.2
Shrubs	2,410.6	37.1	169.0	437.7	1,320.2	446.6
Nonstocked	3,190.1	21.2	146.4	485.1	2,039.8	497.6
All classes	25,772.2	773.4	1,067.5	3,946.4	15,053.0	4,931.9

Table 37. *Average net volume per acre on commercial forest land, by area description and species group, Georgia, 1961*

Area description	Pine		Hardwood [1]		Total	
	Cubic feet	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*
Pine stands:						
Good sites						
Growing stock						
Desirable	302.2	940	19.4	43	321.6	983
Other	433.7	1,205	57.2	120	490.9	1,325
Culls	14.3		13.5		27.8	
Total	750.2	2,145	90.1	163	840.3	2,308
Average sites						
Growing stock						
Desirable	187.9	494	11.8	26	199.7	520
Other	308.7	765	53.6	94	362.3	859
Culls	16.5		12.8		29.3	
Total	513.1	1,259	78.2	120	591.3	1,379
Poor sites						
Growing stock						
Desirable	187.6	512	1.9	7	189.5	519
Other	255.0	805	17.4	22	272.4	827
Culls	5.3		9.6		14.9	
Total	447.9	1,317	28.9	29	476.8	1,346
Upland hardwoods:						
Good sites						
Growing stock						
Desirable	109.7	410	113.0	437	222.7	847
Other	106.3	351	293.7	799	400.0	1,150
Culls	2.7		50.6		53.3	
Total	218.7	761	457.3	1,236	676.0	1,997
Average sites						
Growing stock						
Desirable	55.2	167	50.2	152	105.4	319
Other	67.0	182	270.1	591	337.1	773
Culls	3.6		52.8		56.4	
Total	125.8	349	373.1	743	498.9	1,092
Poor sites						
Growing stock						
Desirable	45.6	111	5.9	14	51.5	125
Other	57.5	157	77.2	149	134.7	306
Culls	2.5		61.5		64.0	
Total	105.6	268	144.6	163	250.2	431
Lowland hardwoods:						
Good sites						
Growing stock						
Desirable	35.2	156	345.2	1,248	380.4	1,404
Other	41.4	161	887.7	2,435	929.1	2,596
Culls	.5		159.3		159.8	
Total	77.1	317	1,392.2	3,683	1,469.3	4,000
Average sites						
Growing stock						
Desirable	27.1	90	123.1	360	150.2	450
Other	40.3	136	484.7	1,088	525.0	1,224
Culls	1.4		123.4		124.8	
Total	68.8	226	731.2	1,448	800.0	1,674
Poor sites						
Growing stock						
Desirable	4.3	13	50.7	89	55.0	102
Other	22.4	64	251.3	368	273.7	432
Culls	5.1		146.3		151.4	
Total	31.8	77	448.3	457	480.1	534
All stands:						
Good sites						
Growing stock						
Desirable	203.8	659	107.2	379	311.0	1,038
Other	279.0	797	280.5	747	559.5	1,544
Culls	8.8		51.7		60.5	
Total	491.6	1,456	439.4	1,126	931.0	2,582
Average sites						
Growing stock						
Desirable	97.3	269	51.4	150	148.7	419
Other	148.6	383	236.3	514	384.9	897
Culls	7.8		53.0		60.8	
Total	253.7	652	340.7	664	594.4	1,316
Poor sites						
Growing stock						
Desirable	90.2	238	7.9	18	98.1	256
Other	121.2	368	70.0	123	191.2	491
Culls	3.6		50.3		53.9	
Total	215.0	606	128.2	141	343.2	747

Table 38. *Average net volume and growth per acre on commercial forest land by ownership, tree class, and species group, Georgia, 1961*

Ownership and tree class	Net volume per acre						Net growth per acre					
	Pine		Hardwood [1]		Total		Pine		Hardwood [1]		Total	
	Cubic feet	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*
National Forest:												
Growing stock												
Desirable	74.2	279	127.4	525	201.6	804	4.6	23	4.6	32	9.2	55
Other	285.2	957	634.7	1,944	919.9	2,901	9.7	44	18.4	46	28.1	90
Culls	7.9		107.4		115.3		1.1		.6		1.7	
Total	367.3	1,236	869.5	2,469	1,236.8	3,705	15.4	67	23.6	78	39.0	145
Other public:												
Growing stock												
Desirable	190.8	683	61.1	237	251.9	920	17.5	51	2.9	8	20.4	59
Other	275.1	972	237.6	686	512.7	1,658	11.5	65	7.3	31	18.8	96
Culls	6.2		51.4		57.6		.8		.9		1.7	
Total	472.1	1,655	350.1	923	822.2	2,578	29.8	116	11.1	39	40.9	155
Forest industry:												
Growing stock												
Desirable	192.3	593	76.8	267	269.1	860	19.1	80	3.1	12	22.2	92
Other	243.1	671	218.2	529	461.3	1,200	15.5	64	7.9	22	23.4	86
Culls	7.7		47.0		54.7		1.5		1.6		3.1	
Total	443.1	1,264	342.0	796	785.1	2,060	36.1	144	12.6	34	48.7	178
Farmer-owned:												
Growing stock												
Desirable	140.4	418	71.1	224	211.5	642	15.4	60	3.8	16	19.2	76
Other	187.8	498	233.0	538	420.8	1,036	13.1	57	10.2	37	23.3	94
Culls	7.6		52.1		59.7		1.6		1.4		3.0	
Total	335.8	916	356.2	762	692.0	1,678	30.1	117	15.4	53	45.5	170
Misc. private:												
Growing stock												
Desirable	129.0	398	75.8	256	204.8	654	13.3	42	3.6	19	16.9	61
Other	210.9	584	242.7	587	453.6	1,171	13.6	47	8.7	34	22.3	81
Culls	10.0		48.2		58.2		1.6		1.2		2.8	
Total	349.9	982	366.7	843	716.6	1,825	28.5	89	13.5	53	42.0	142
All ownerships:												
Growing stock												
Desirable	146.3	448	74.2	246	220.5	694	15.3	58	3.7	16	19.0	74
Other	207.2	574	244.8	594	452.0	1,168	13.4	56	9.7	34	23.1	90
Culls	8.0		52.2		60.2		1.5		1.3		2.8	
Total	361.5	1,022	371.2	840	732.7	1,862	30.2	114	14.7	50	44.9	164

[1] Includes cypress

Table 39. *Land area, by class, major forest type, and survey completion date, Georgia, 1936, 1953, and 1961*

Land class and forest type	Survey completion date			Change
	1936	1953	1961	1953-1961
	Thousand acres			
Commercial forest land:				
Pine and oak-pine type	16,727.5	15,883.0	16,812.2	+ 929.2
Hardwood type	4,607.1	8,086.1	8,960.0	+ 873.9
Total	21,334.6	23,969.1	25,772.2	+1,803.1
Noncommercial forest land	97.9	87.5	67.2	— 20.3
Nonforest land:				
Cropland	11,866.7	7,559.8	5,675.7	—1,884.1
Improved pasture	697.5	1,648.9	2,524.8	+ 875.9
Idle or abandoned cropland	2,179.3	2,143.2	1,273.0	— 870.2
Marsh or prairie	583.5	493.7	430.7	— 63.0
Urban and other	717.1	1,297.1	1,370.1	+ 73.0
Total	16,044.1	13,142.7	11,274.3	—1,868.4
All land [1]	37,476.6	37,199.3	37,113.7	— 85.6

[1] Excludes all water areas.

Table 40. *Volume [1] of sawtimber and all timber, by species group, diameter class, and survey completion date, Georgia*

Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
		SAWTIMBER									
		Million board feet									
Pine [2]	1936	26,480.7			5,199.9	6,004.6	5,098.1	3,653.3	2,459.9	1,521.3	2,543.6
	1953	25,027.9			7,393.8	7,155.9	4,837.1	2,754.7	1,399.9	645.9	840.6
	1961	26,608.1			7,812.2	7,491.2	5,135.8	2,934.1	1,610.3	802.7	821.8
Cypress	1936	1,978.0			266.0	381.0	311.0	197.0	133.0	127.0	563.0
	1953	1,868.0			305.0	468.0	350.0	152.0	127.0	92.0	374.0
	1961	1,774.0			330.0	506.0	364.0	178.0	89.0	80.0	227.0
Hardwood [3]	1936	16,929.0				3,125.0	3,220.0	2,974.0	2,288.0	1,744.0	3,578.0
	1953	18,859.0				4,031.0	4,212.0	3,216.0	2,420.0	1,695.0	3,285.0
	1961	18,443.0				4,411.0	4,288.0	3,073.0	2,337.0	1,688.0	2,646.0
		ALL TIMBER									
		Million cubic feet									
Pine	1936	7,849.9	656.5	1,225.7	1,404.0	1,410.6	1,103.8	767.3	496.8	304.4	480.8
	1953	8,549.1	1,021.4	1,683.9	1,983.0	1,672.0	1,042.1	582.6	281.8	128.4	153.9
	1961	9,384.7	1,277.7	1,873.6	2,115.6	1,758.9	1,109.6	616.6	320.9	159.6	152.2
Cypress	1936	572.2	41.9	67.3	89.6	94.2	63.1	38.3	27.9	30.5	119.4
	1953	590.8	54.0	82.9	104.0	118.0	73.6	29.9	26.6	22.8	79.0
	1961	591.1	54.2	100.3	113.3	125.4	76.7	35.1	18.9	19.0	48.2
Hardwood	1936	7,092.9	694.6	847.0	994.7	1,022.9	883.9	750.5	580.4	422.5	896.4
	1953	8,715.0	883.2	1,169.4	1,476.4	1,324.2	1,168.6	822.4	620.9	417.0	832.9
	1961	8,906.0	1,070.6	1,295.5	1,464.7	1,440.8	1,179.9	781.0	593.9	411.0	668.6

[1] In order to provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in the previous surveys.
[2] Includes other softwoods except cypress.
[3] Hardwood sawtimber has been adjusted to include only trees with saw-log length of 12 feet or more.

Table 41. *Volume of all timber, by species group, survey unit, and survey completion date, Georgia*

Species group and survey unit	1936	1953	Change 1936-1953	1961	Change 1953-1961
	Million cubic feet		*Percent*	*Million cubic feet*	*Percent*
Pine:[1]					
Southeast	2,529.0	3,321.5	+31.3	3,247.9	− 2.2
Southwest	1,063.4	1,160.3	+ 9.1	1,041.4	−10.2
Central	2,352.3	2,268.3	− 3.6	2,896.5	+27.7
North Central	1,035.0	1,058.2	+22.4	1,312.7	+24.1
North	870.2	740.8	−14.9	886.2	+19.6
All units	7,849.9	8,549.1	+ 8.9	9,384.7	+ 9.8
Cypress:					
Southeast	465.4	427.3	− 8.2	402.2	− 5.9
Southwest	77.1	118.6	+53.8	118.7	+ .1
Central	29.7	44.9	+51.2	70.2	+56.3
North Central	.	.	.	.	.
North	.	.	.	.	.
All units	572.2	590.8	+ 3.3	591.1	+ .1
Hardwood:					
Southeast	2,176.8	2,496.1	+14.7	2,326.8	− 6.8
Southwest	507.2	971.1	+91.5	871.0	−10.3
Central	2,224.8	2,476.8	+11.3	2,690.2	+ 8.6
North Central	827.0	1,127.4	+36.3	1,382.1	+22.6
North	1,357.1	1,643.6	+21.1	1,635.9	− .5
All units	7,092.9	8,715.0	+22.9	8,906.0	+ 2.2

[1] Includes other softwoods except cypress.

Table 42. *County area, by class, Georgia, 1961*

County	Total area [1]	Forest		Nonforest	
		Commercial	Non-commercial	Land	Water
	Thousand acres				
Appling	329.6	245.5	.	82.2	1.9
Atkinson	203.5	173.4	.	29.5	.6
Bacon	187.5	129.1	...	57.0	1.4
Baker	227.8	132.4	...	94.2	1.2
Baldwin	169.6	117.7	...	47.6	4.3
Banks	147.8	113.2	.	34.4	.2
Barrow	109.4	48.9	.	60.2	.3
Bartow	304.6	201.2	.	92.1	11.3
Ben Hill	163.2	111.0	.	51.6	.6
Berrien	300.8	207.7	.	92.0	1.1
Bibb	162.6	97.6	0.6	61.0	3.4
Bleckley	140.1	71.1	.	66.6	2.4
Brantley	286.1	252.6	.	32.1	1.4
Brooks	318.1	187.1	.	130.2	.8
Bryan	291.2	231.9	4.2	42.3	12.8
Bulloch	438.4	253.2	.1	178.8	6.3
Burke	532.5	309.3	.	221.4	1.8
Butts	120.3	83.1	.1	35.8	1.3
Calhoun	185.0	92.6	.	91.3	1.1
Camden	444.8	317.5	.	95.3	32.0
Candler	160.6	94.6	.	64.8	1.2
Carroll	316.8	190.2	.	125.0	1.6
Catoosa	106.9	55.6	3.9	47.2	.2
Charlton	511.4	476.0	.	30.5	4.9
Chatham	321.3	120.2	(2)	149.5	51.6
Chattahoochee	161.9	121.0	24.3	14.3	2.3
Chattooga	202.9	155.6	.	46.9	.4
Cherokee	273.9	213.7	.	49.2	11.0
Clarke	80.0	43.6		36.1	.3
Clay	143.3	85.6		57.3	.4
Clayton	95.4	55.3	.	39.1	1.0
Clinch	510.1	496.8	.	12.7	.6
Cobb	222.7	145.4	2.2	73.1	2.0
Coffee	392.3	266.5	(2)	124.7	1.1
Colquitt	360.3	151.5	.	206.4	2.4
Columbia	197.1	152.8	.	31.8	12.5
Cook	149.1	86.4	.	62.1	.6
Coweta	283.5	215.1	.	66.8	1.6
Crawford	201.6	164.3	.	36.7	.6
Crisp	190.7	80.8	.	106.8	3.1
Dade	105.6	81.1	.6	23.9	.
Dawson	136.3	117.2	.	16.2	2.9
Decatur	392.3	233.7	.	142.1	16.5
De Kalb	172.2	97.0	.3	73.4	1.5
Dodge	320.0	221.8	.	97.4	.8
Dooly	252.8	95.5	(2)	156 0	1.3
Dougherty	210.6	106.6	.	100.0	4.0
Douglas	129.3	95.7	.	32.5	1.1
Early	336.7	167.9	.	167.6	1.2
Echols	272.0	256.3	.	15.5	.2
Effingham	307.2	260.6	.	45.5	1.1
Elbert	233.6	154.5	(2)	75.7	3.4
Emanuel	439.1	305.8	.	130.9	2.4
Evans	119.0	79.2	1.5	37.2	1.1
Fannin	256.0	221.9	.	30.8	3.3
Fayette	127.4	79.5	.	47.2	.7
Floyd	329.0	214.5	.	110.1	4.4
Forsyth	155.5	84.5	.	57.5	13.5
Franklin	172.2	80.2	.	90.5	1.5
Fulton	339.8	205.2	.	129.9	4.7
Gilmer	281.0	264.4	.	16.6	.
Glascock	91.5	62.2	.	29.3	.
Glynn	297.6	170.3	(2)	89.4	37.9
Gordon	229.1	130.7	(2)	97.3	1.1
Grady	298.9	166.2	.	131.9	.8
Greene	258.6	208.9	.	48.2	1.5
Gwinnett	279.7	182.9	.	94.9	1.9
Habersham	181.1	137.2	.2	42.6	1.1
Hall	272.6	186.5	.	61.1	25.0
Hancock	310.4	254.3	.	48.5	7.6
Haralson	182.4	150.4	.	31.3	.7
Harris	302.7	242.8	..	51.6	8.3
Hart	165.1	65.4		84.8	14.9
Heard	193.3	157.7		34.6	1.0
Henry	211.8	119.8	.	91.6	.4
Houston	243.2	142.2	.	100.6	.4
Irwin	238.1	139.9	.	95.7	2.5
Jackson	215.7	127.9	.	87.7	.1
Jasper	240.0	193.7		44.2	2.1
Jeff Davis	211.8	168.9	.	41.4	1.5
Jefferson	340.5	194.0	.	141.6	4.9
Jenkins	224.6	146.2	0.2	77.6	.6
Johnson	200.3	113.5	.	86.2	.6
Jones	257.3	215.9	.	40.2	1.2
Lamar	115.8	77.4	.	38.2	.2
Lanier	117.1	95.8	.	20.0	1.3
Laurens	519.1	311.5	(2)	206.1	1.5
Lee	229.1	108.3	(2)	118.2	2.6
Liberty	343.0	250.2	7.0	66.7	19.1
Lincoln	163.2	111.0	.	32.1	20.1
Long	257.9	231.0	1.5	24.2	1.2
Lowndes	327.7	218.8	.	104.5	4.4
Lumpkin	186.9	171.5	1.1	14.0	.3
McDuffie	168.3	121.3	.	45.1	1.9
McIntosh	306.6	175.5	2.9	85.6	42.6
Macon	257.9	152.3	( )	104.8	.8
Madison	179.9	95.0	.	84.2	.7
Marion	233.6	183.9	.	49.7	.
Meriwether	319.4	243.2	.	75.7	.5
Miller	183.7	84.2	.	99.3	.2
Mitchell	327.0	128.0	.	198.0	1.0
Monroe	255.4	217.8	.	36.6	1.0
Montgomery	151.7	103.6	.	46.8	1.3
Morgan	227.8	146.5	.	80.8	.5
Murray	218.9	171.3	.	47.6	.
Muscogee	142.1	95.0	4.0	40.2	2.9
Newton	174.7	117.7	.	55.0	2.0
Oconee	119.0	62.7	.	56.2	.1
Oglethorpe	278.4	211.3	.	66.6	.5
Paulding	203.5	167.3	.	35.5	.7
Peach	96.6	43.0	.	53.4	.2
Pickens	144.0	120.2	.	22.9	.9
Pierce	218.9	148.5	.	69.9	.5
Pike	147.2	90.9	.	53.8	2.5
Polk	199.7	144.4	.	55.0	.3
Pulaski	162.6	84.7	.	77.3	.6
Putnam	224.0	181.9	.	36.9	5.2
Quitman	109.4	88.5	.	20.2	.7
Rabun	240.0	219.7	1.5	13.5	5.3
Randolph	279.0	185.4	.	92.0	1.6
Richmond	208.6	140.2	1.0	64.4	3.0
Rockdale	81.9	49.5	.	31.7	.7
Schley	103.7	69.5	.	34.2	.
Screven	416.6	248.7	.	165.4	2.5
Seminole	177.3	75.1	.	89.6	12.6
Spalding	128.6	73.3	.	54.6	.7
Stephens	115.2	73.5	.7	37.5	3.5
Stewart	296.3	247.1	.	47.4	1.8
Sumter	314.9	165.5	.	147.1	2.3
Talbot	249.6	219.2	.	29.2	1.2
Taliaferro	124.8	101.8	(2)	22.8	.2
Tattnall	315.5	230.9	1.9	80.8	1.9
Taylor	257.9	212.4	.	44.0	1.5
Telfair	281.6	207.2	.	73.7	.7
Terrell	210.6	94.7	.	115.7	.2
Thomas	347.5	207.2	.	138.2	2.1
Tift	170.2	70.5	.	98.0	1.7
Toombs	236.2	144.9	.	90.6	.7
Towns	110.1	95.9	...	9.6	4.6
Treutlen	124.2	85.3	.	38.7	.2
Troup	286.1	211.2	.	72.8	2.1
Turner	187.5	88.8	.	95.8	2.9
Twiggs	233.6	195.9	.	36.8	.9
Union	204.2	160.8	1.9	36.1	5.4
Upson	213.8	175.4	.	34.9	3.5
Walker	286.7	211.5	1.2	73.8	.2
Walton	211.2	117.0	.	93.1	1.1
Ware	583.7	503.5	3.5	69.9	6.8
Warren	181.8	111.9	.	69.9	.
Washington	431.4	306.9	.1	122.0	2.4
Wayne	413.4	354.8	.	57.2	1.4
Webster	124.8	90.0	.	34.8	..
Wheeler	195.8	151.5	.	43.6	.7
White	155.5	135.3	.7	19.3	.2
Whitfield	179.8	120.0	.	59.2	.6
Wilcox	245.8	162.6	...	82.1	1.1
Wilkes	302.1	216.9	.	84.1	1.1
Wilkinson	293.1	262.1	.	30.6	.4
Worth	371.2	176.7	.	193.1	1.4
Total	37,680.5	25,772.2	67.2	11,274.3	566.8

[1] Gross area from Bureau of the Census, 1950.
[2] Less than 50 acres.

Table 43. *Commercial forest land, by county and ownership, Georgia, 1961*

County	All ownerships	National Forest	Other public	Forest industry	Farmer-owned	Misc. private
	Thousand acres					
Appling	245.5	.	0.9	33.1	189.5	22.0
Atkinson	173.4	.	.	56.0	114.1	3.3
Bacon	129.1	.	.	17.9	100.9	10.3
Baker	132.4	.	.	8.4	121.8	2.2
Baldwin	117.7	.	4.9	19.5	73.3	20.0
Banks	113.2	0.6	.	9.1	56.2	47.3
Barrow	48.9	.	2.1	.8	41.6	4.4
Bartow	201.2	.	4.7	29.7	98.2	68.6
Ben Hill	111.0	.	.1	5.3	101.8	3.8
Berrien	207.7	.	2.6	16.6	188.5	.
Bibb	97.6	.	.5	5.9	49.5	41.7
Bleckley	71.1	.	.1	9.2	58.0	3.8
Brantley	252.6	.	5.0	91.2	119.6	36.8
Brooks	187.1	.	.3	18.3	159.8	8.7
Bryan	231.9	..	105.2	70.3	49.2	7.2
Bulloch	253.2	.	.5	27.7	203.4	21.6
Burke	309.3	.	.	52.0	238.4	18.9
Butts	83.1	.	.4	7.1	68.3	7.3
Calhoun	92.6	.	.1	8.0	84.5	.
Camden	317.5	.	4.6	164.2	40.9	107.8
Candler	94.6	.	.	6.2	75.8	12.6
Carroll	190.2	.	.2	31.1	148.9	10.0
Catoosa	55.6	.	1.6	4.1	40.4	9.5
Charlton	476.0	..	147.0	108.0	56.5	164.5
Chatham	120.2	.	7.6	40.9	27.6	44.1
Chattahoochee	121.0	.	84.4	6.1	6.9	23.6
Chattooga	155.6	12.5	.	14.4	85.4	43.3
Cherokee	213.7	.	5.4	50.2	138.3	19.8
Clarke	48.6	..	1.7	1.4	29.5	11.0
Clay	85.6	.	6.3	6.0	62.7	10.6
Clayton	55.3	.	.3	.8	34.0	20.2
Clinch	496.8	.	14.5	160.9	97.6	223.8
Cobb	145.4	.	2.1	.	25.6	117.7
Coffee	266.5	.	.	15.0	242.0	9.5
Colquitt	151.5	.	1.1	1.0	129.0	20.4
Columbia	152.8	.	13.7	17.6	96.6	24.9
Cook	86.4	.	.1	.	83.7	2.6
Coweta	215.1	.	1.1	16.7	164.7	32.6
Crawford	164.3	.	.1	51.9	42.9	69.4
Crisp	80.8	.	1.0	.	68.1	11.7
Dade	81.1	.	1.5	5.7	29.9	44.0
Dawson	117.2	5.3	10.6	23.9	49.7	27.7
Decatur	233.7	.	7.8	21.0	172.4	32.5
De Kalb	97.0	.	2.8	.	18.9	75.3
Dodge	221.8	.	.	26.7	165.0	30.1
Dooly	95.5	4.1	.	1.7	84.7	5.0
Dougherty	106.6	.	1.1	15.0	81.3	9.2
Douglas	95.7	.	.	7.9	38.9	48.9
Early	167.9	.	1.1	.5	149.7	16.6
Echols	256.3	.	.	23.6	81.4	151.3
Effingham	260.6	.	.1	49.5	201.2	9.8
Elbert	154.5	.	3.8	31.7	70.6	48.4
Emanuel	305.8	.	.3	57.9	207.4	40.2
Evans	79.2	.	16.0	6.1	52.6	4.5
Fannin	221.9	95.9	.3	5.8	78.8	41.1
Fayette	79.5	.	.1	1.4	72.0	6.0
Floyd	214.5	6.4	1.1	20.5	68.0	118.5
Forsyth	84.5	.	5.2	4.3	59.8	15.2
Franklin	80.2	.	1.0	6.2	63.0	10.0
Fulton	205.2	.	1.3	6.7	98.7	98.5
Gilmer	264.4	23.5	.	62.9	95.5	82.5
Glascock	62.2	.	.	9.3	43.9	9.0
Glynn	170.3	.	4.2	82.3	52.3	31.5
Gordon	130.7	6.9	.	29.2	63.1	31.5
Grady	166.2	.	.1	3.5	120.4	42.2
Greene	208.9	22.6	.5	35.5	128.9	21.4
Gwinnett	182.9	.	.8	2.0	112.3	67.8
Habersham	137.2	42.0	.3	1.1	33.7	60.1
Hall	186.5	.	10.7	15.7	75.8	84.3
Hancock	254.3	.	.	36.9	180.0	37.4
Haralson	150.4	.	.	20.3	89.6	40.5
Harris	242.8	.	5.0	14.5	106.6	116.7
Hart	65.4	.	2.7	2.3	47.3	13.1
Heard	157.7	.	.	48.3	58.4	51.0
Henry	119.8	.	.	4.2	82.9	32.7
Houston	142.2	.	2.6	38.4	89.2	12.0
Irwin	139.9	.	.	13.2	114.3	12.4
Jackson	127.9	.	.8	2.7	72.9	51.5
Jasper	193.7	25.0	5.1	24.1	131.1	8.4
Jeff Davis	168.9	.	.	46.0	106.6	16.3
Jefferson	194.0	.	4.0	23.7	166.3	.
Jenkins	146.2	...	.9	34.8	99.4	11.1
Johnson	113.5	.	.	14.6	95.3	3.6
Jones	215.9	16.4	25.2	56.4	79.8	38.1
Lamar	77.4	..	.1	13.8	54.9	8.6
Lanier	95.8	.	8.6	11.4	66.2	9.6
Laurens	311.5	..	.5	25.1	219.6	66.3
Lee	108.3	.	.4	.8	107.1	.
Liberty	250.2	.	108.3	41.3	58.2	42.4
Lincoln	111.0	.	30.6	5.5	70.9	4.0
Long	231.0	.	26.3	83.1	56.0	65.6
Lowndes	218.8	.	4.4	36.8	156.0	21.6
Lumpkin	171.5	55.4	.4	10.3	58.2	47.2
McDuffie	121.3	.	14.9	6.1	90.6	9.7
McIntosh	175.5	.	1.2	127.5	35.8	11.0
Macon	152.3	.	.1	7.1	118.2	26.9
Madison	95.0	..	.	9.3	64.8	20.9
Marion	183.9	.	.4	52.1	71.5	59.9
Meriwether	243.2	.	7.0	34.1	169.2	32.9
Miller	84.2	.	.	10.6	72.2	1.4
Mitchell	128.0	.	.1	.1	125.9	1.9
Monroe	217.8	.	.1	55.1	141.2	21.4
Montgomery	103.6	.	.	8.6	95.0	.
Morgan	146.5	.4	5.9	17.5	104.7	18.0
Murray	171.3	35.3	2.6	24.5	88.9	20.0
Muscogee	95.0	.	40.3	2.7	23.5	28.5
Newton	117.7	.	.2	6.3	93.0	18.2
Oconee	62.7	.3	.4	2.9	59.1	.
Oglethorpe	211.3	4.0	.	72.8	104.7	29.8
Paulding	167.3	.	.1	28.3	76.4	62.5
Peach	43.0	.	.3	4.5	25.4	12.8
Pickens	120.2	.	.	21.2	83.2	15.8
Pierce	148.5	.	.1	17.5	120.0	10.9
Pike	90.9	.	.2	5.6	85.1	.
Polk	144.4	.	.	28.3	71.0	45.1
Pulaski	84.7	.	.	8.3	73.2	3.2
Putnam	181.9	29.8	13.3	43.0	76.8	19.0
Quitman	88.5	.	2.2	11.8	60.8	13.7
Rabun	219.7	142.6	.	2.4	41.7	33.0
Randolph	185.4	.	.2	7.7	110.4	67.1
Richmond	140.2	.	42.1	14.2	38.1	45.8
Rockdale	49.5	.	.	1.5	37.7	10.3
Schley	69.5	.	.	6.4	52.4	10.7
Screven	248.7	.	1.2	34.2	189.7	23.6
Seminole	75.1	.	4.3	3.4	67.4	.
Spalding	73.3	.	.3	2.2	64.1	6.7
Stephens	73.5	20.9	1.8	5.2	18.3	27.3
Stewart	247.1	.	2.3	55.2	168.7	20.9
Sumter	165.5	.	.6	3.6	142.0	19.3
Talbot	219.2	..	.	41.7	157.0	20.5
Taliaferro	101.8	..	1.1	13.5	58.8	28.4
Tattnall	230.9	..	9.2	17.5	173.6	30.6
Taylor	212.4	.	.	18.5	153.4	40.5
Telfair	207.2	.	.2	32.3	145.1	29.6
Terrell	94.7	..	.	4.0	80.1	10.6
Thomas	207.2	.	.5	10.4	186.4	9.9
Tift	70.5	.	1.7	1.2	60.8	6.8
Toombs	144.9	..	1.4	30.0	100.0	13.5
Towns	95.9	56.1	.3	.2	29.4	9.9
Treutlen	85.3	.	.	10.8	73.0	1.5
Troup	211.2	.	.3	26.7	155.1	29.1
Turner	88.8	.	.1	2.0	72.2	14.5
Twiggs	195.9	.	.2	42.0	79.1	74.6
Union	160.8	90.7	.7	2.4	57.5	9.5
Upson	175.4	.	.1	25.7	103.9	45.7
Walker	211.5	15.3	.3	4.0	100.7	91.2
Walton	117.0	.	.1	1.4	88.6	26.9
Ware	503.5	.	184.5	140.3	111.6	67.1
Warren	111.9	..	.1	16.8	81.7	13.3
Washington	306.9	.	.6	22.6	216.0	67.7
Wayne	354.8	..	.	209.0	110.8	35.0
Webster	90.0	...	.	21.8	53.7	14.5
Wheeler	151.5	.	1.2	16.6	116.9	16.8
White	135.3	40.2	.2	3.9	54.8	36.2
Whitfield	120.0	21.2	.2	10.2	78.2	10.2
Wilcox	162.6	.	.1	33.5	118.4	10.6
Wilkes	216.9	.	5.1	39.5	161.8	10.5
Wilkinson	262.1	.	.2	56.8	118.2	86.9
Worth	176.7	.	.1	.6	145.1	30.9
Total	25,772.2	773.4	1,067.5	3,946.4	15,053.0	4,931.9

Table 44. *Volume of sawtimber and all timber, by county and species group, Georgia, 1961*

County	Sawtimber					All timber [1]				
	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					*Thousand cords*				
Appling	491.6	424.5	16.9	37.9	12.3	2,484	2,007	91	307	79
Atkinson	258.4	146.7	30.5	81.2	.	1,421	763	103	523	32
Bacon	202.9	158.1	5.8	36.3	2.7	1,312	859	46	346	61
Baker	155.4	72.5	24.7	7.9	50.3	748	212	50	76	410
Baldwin	225.1	183.1	.	21.0	21.0	1,356	1,024		160	172
Banks	168.1	86.3	.	17.1	64.7	1,259	657	3	210	389
Barrow	78.3	37.6	.	17.2	23.5	562	288		115	159
Bartow	172.8	106.7	.	4.9	61.2	1,399	693		62	644
Ben Hill	202.1	171.5	.	26.7	3.9	859	689		143	27
Berrien	447.7	323.0	37.4	81.9	5.4	2,391	1,469	235	608	79
Bibb	312.2	194.0	.	60.1	58.1	1,434	807		370	257
Bleckley	89.2	32.7	.7	24.2	31.6	686	191	7	249	239
Brantley	513.9	272.3	41.7	170.4	29.5	2,717	1,367	219	886	245
Brooks	367.4	172.1	56.9	53.0	85.4	1,951	670	355	520	406
Bryan	542.3	367.7	3.1	127.7	43.8	2,894	1,692	15	905	282
Bulloch	591.6	352.8	19.6	164.4	54.8	3,069	1,485	98	1,148	338
Burke	591.1	239.8	23.5	226.2	101.6	2,924	845	92	1,339	648
Butts	214.9	125.2	.	56.6	33.1	912	523	2	240	147
Calhoun	166.8	63.3	3.7	52.6	47.2	856	193	14	383	266
Camden	833.6	497.2	28.9	141.5	166.0	4,813	2,661	125	1,073	954
Candler	128.0	99.1	.3	16.6	12.0	772	477	5	227	63
Carroll	179.6	62.0	.	14.4	103.2	1,062	342		148	572
Catoosa	96.5	15.4	.	5.4	75.7	527	132		41	354
Charlton	866.4	500.3	272.9	82.4	10.8	4,086	2,336	768	890	92
Chatham	307.1	128.8	5.8	104.2	68.3	1,909	548	30	873	458
Chattahoochee	547.4	456.5	.	56.3	34.6	1,900	1,250		434	216
Chattooga	159.0	56.6	.	16.9	85.5	1,365	518		131	716
Cherokee	298.8	106.0	.	41.6	151.2	1,996	938		236	812
Clarke	78.2	38.0	.	24.7	15.5	456	230		136	90
Clay	132.8	68.5	.	15.4	48.9	771	368		155	248
Clayton	98.0	54.3	.	20.8	22.9	536	286		133	117
Clinch	787.3	605.1	137.8	41.4	3.0	4,177	2,899	525	700	53
Cobb	183.9	124.8	.	31.6	27.5	1,364	884		229	251
Coffee	404.8	253.6	17.8	111.2	22.2	2,442	1,357	162	825	98
Colquitt	245.7	202.6	.	30.8	12.3	1,019	697	1	234	87
Columbia	247.3	171.1	.	46.7	29.5	1,613	1,051		348	214
Cook	117.8	90.3	.6	19.2	7.7	711	430	6	162	113
Coweta	344.1	141.0	.	116.4	86.7	1,941	789		577	575
Crawford	311.1	237.3	.	54.1	19.7	1,493	863		427	203
Crisp	143.4	94.7	1.6	31.4	15.7	718	369	8	237	104
Dade	113.6	8.0	.	11.1	94.5	646	116	2	113	415
Dawson	319.1	181.8	.	13.9	123.4	1,454	712		77	665
Decatur	435.1	263.4	9.8	90.9	71.0	2,155	1,056	30	534	535
De Kalb	397.3	168.8	.	53.1	175.4	1,523	722		210	591
Dodge	333.9	208.4	5.0	76.6	43.9	1,690	852	13	590	235
Dooly	152.9	59.3	13.3	48.5	31.8	805	317	45	255	188
Dougherty	393.1	130.6	99.1	51.7	111.7	1,502	478	309	269	446
Douglas	127.8	18.0	.	51.0	58.8	1,033	333		253	447
Early	316.1	112.7	26.5	81.7	95.2	1,551	424	116	524	487
Echols	657.7	498.8	114.8	40.1	4.0	2,967	2,037	556	333	41
Effingham	440.5	207.7	39.3	100.5	93.0	2,569	1,195	142	683	549
Elbert	166.5	63.7	.	26.4	76.4	1,258	589	5	245	419
Emanuel	405.9	276.3	.	97.5	32.1	2,382	1,304		726	352
Evans	160.5	123.7	6.5	22.4	7.9	867	476	52	253	86
Fannin	408.2	11.1	31.9	54.1	311.1	2,538	110	96	411	1,921
Fayette	130.0	48.7	.	55.4	25.9	966	373		364	229
Floyd	287.4	164.3	.	50.0	73.1	1,691	822		223	646
Forsyth	99.8	65.0	.	1.7	33.1	789	567		27	195
Franklin	125.1	51.6	.5	17.2	55.8	729	286	8	131	304
Fulton	468.7	211.5	.	54.4	202.8	2,192	1,143		359	690
Gilmer	483.4	43.0	46.9	40.9	352.6	3,046	621	109	351	1,965
Glascock	98.3	47.1	.	27.3	23.9	756	246		303	207
Glynn	430.4	269.6	40.5	50.3	70.0	2,327	1,193	135	430	569
Gordon	121.8	60.7	.	9.5	51.6	1,006	541		107	358
Grady	355.1	236.0	.	47.7	71.4	1,506	713		430	363
Greene	440.9	310.0	.	55.6	75.3	2,599	1,741		466	392
Gwinnett	385.3	141.4		105.0	138.9	1,807	912		445	450
Habersham	303.4	153.3		25.2	124.9	1,818	709	7	146	956
Hall	277.9	149.0	.	9.7	119.2	1,794	994		35	765
Hancock	370.7	221.2	.	84.5	65.0	2,739	1,791		617	331
Haralson	160.5	13.1	.	55.9	91.5	1,312	216		377	719
Harris	465.6	325.1	.	66.5	74.0	2,766	1,667		490	609
Hart	65.3	30.3	.	11.7	23.3	534	255	1	98	180
Heard	165.1	73.6	.	58.1	33.4	995	504		261	230
Henry	278.1	138.3	.	54.4	85.4	1,547	982		202	363
Houston	453.6	89.3	4.0	205.6	154.7	2,252	513	24	1,043	672
Irwin	169.9	139.0	9.6	16.1	5.2	1,034	633	66	289	46
Jackson	114.5	86.5	.	14.9	13.1	758	518	3	115	122
Jasper	613.0	427.1	.	78.1	107.8	2,696	1,746	27	406	517
Jeff Davis	300.6	274.7	.2	7.3	18.4	1,592	1,300	10	166	116

Table 44. *Volume of sawtimber and all timber, by county and species group, Georgia, 1961* (Continued)

County	Sawtimber					All timber [1]				
	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					*Thousand cords*				
Jefferson	418.9	117.0	17.9	174.5	109.5	2,086	467	106	1,017	496
Jenkins	290.5	61.2	24.2	118.5	86.6	1,605	361	72	641	531
Johnson	255.3	102.7	.	102.9	49.7	1,231	410		597	224
Jones	483.9	405.6	.	22.7	55.6	2,305	1,819		255	231
Lamar	144.9	76.2	.	28.0	40.7	841	431	2	209	199
Lanier	188.6	113.1	28.0	37.6	9.9	1,112	496	150	407	59
Laurens	516.6	210.2	5.9	190.6	109.9	2,805	1,102	21	1,180	502
Lee	102.1	40.9	1.8	16.9	42.5	509	171	4	97	237
Liberty	665.2	382.0	19.6	158.8	104.8	3,248	1,629	60	837	722
Lincoln	233.4	195.7	.	9.3	28.4	1,250	987		75	188
Long	691.6	318.0	34.6	106.4	232.6	3,463	1,661	211	864	727
Lowndes	481.9	306.5	31.0	100.4	44.0	2,245	1,058	167	691	329
Lumpkin	401.9	79.6	66.9	29.5	225.9	1,937	453	150	171	1,163
McDuffie	160.4	99.3	.	42.2	18.9	1,249	795		301	153
McIntosh	339.6	106.4	38.8	91.7	102.7	1,717	463	135	650	469
Macon	245.7	101.2	.	74.1	70.4	1,346	535		459	352
Madison	193.7	45.4	.	99.0	49.3	920	322	3	384	211
Marion	236.0	132.4	.	76.1	27.5	1,310	588		394	328
Meriwether	349.1	175.3	.	55.9	117.9	2,111	984		552	575
Miller	139.2	75.5	9.3	21.7	32.7	785	260	55	134	336
Mitchell	166.0	133.9	5.9	16.3	9.9	673	409	23	121	120
Monroe	328.7	222.9	.	42.6	63.2	2,205	1,412		455	338
Montgomery	207.1	124.8	4.0	32.6	45.7	1,006	563	23	213	207
Morgan	224.5	136.5	.	49.5	38.5	1,332	735		379	218
Murray	252.9	90.3	19.6	15.3	127.7	2,021	983	40	144	854
Muscogee	321.4	241.3	.	47.2	32.9	1,253	751		291	211
Newton	180.7	87.2	.	13.2	80.3	1,099	495		137	467
Oconee	91.4	47.9	.	28.4	15.1	664	292	1	217	154
Oglethorpe	380.7	216.3	.	105.7	58.7	2,612	1,551		742	319
Paulding	217.6	119.1		56.4	42.1	1,852	909		541	402
Peach	81.8	46.7	.	20.7	14.4	445	190		176	79
Pickens	214.0	123.8	3.4	9.1	77.7	1,535	982	14	103	436
Pierce	271.1	188.2	16.2	63.9	2.8	1,387	956	67	332	32
Pike	209.8	125.4	1.1	60.1	23.2	1,101	577	9	367	148
Polk	105.6	53.0	.	6.3	46.3	989	537		23	429
Pulaski	138.9	52.6	14.4	40.4	31.5	814	208	39	312	255
Putnam	552.9	460.1	.	48.7	44.1	2,381	1,795	6	283	297
Quitman	113.0	66.2	.	13.4	33.4	900	478		225	197
Rabun	714.1	251.5	38.4	104.7	319.5	3,491	967	162	436	1,926
Randolph	330.6	119.6	.	153.6	57.4	1,713	458		889	366
Richmond	236.2	133.9	6.4	72.7	23.2	1,195	515	34	460	186
Rockdale	40.5	17.3	.	15.0	8.2	304	158	1	85	60
Schley	84.7	37.8	.	33.0	13.9	640	264	2	257	117
Screven	662.7	313.0	44.6	178.5	126.6	2,845	1,044	144	1,027	630
Seminole	97.8	78.0	.8	1.8	17.2	567	359	8	39	161
Spalding	108.7	78.1	.3	26.1	4.2	635	421	1	165	48
Stephens	136.9	66.7	.	4.9	65.3	824	444		33	347
Stewart	503.9	394.4	.	50.3	59.2	2,449	1,809		298	342
Sumter	182.9	86.3	.	49.0	47.6	976	402		355	219
Talbot	213.0	150.3	.	25.9	36.8	1,687	1,088		271	328
Taliaferro	201.2	132.6	.	47.9	20.7	1,265	763		309	193
Tattnall	522.0	361.2	.8	83.2	76.8	2,473	1,471	40	592	370
Taylor	179.3	69.4	.	65.0	44.9	1,193	450		377	366
Telfair	450.3	233.1	.	117.5	99.7	2,160	955		747	458
Terrell	164.9	34.9	10.9	100.2	18.9	874	143	39	549	143
Thomas	606.6	446.5	.	53.7	106.4	2,241	1,215		412	614
Tift	92.5	69.2	4.8	11.9	6.6	513	287	37	139	50
Toombs	177.3	89.3	5.4	68.4	14.2	1,210	553	17	553	87
Towns	233.5	5.0	.	22.0	206.5	1,407	232		160	1,015
Treutlen	197.0	170.4	.4	19.9	6.3	981	748	2	180	51
Troup	232.1	157.5	.	74.6	.	1,605	1,071		399	135
Turner	204.2	137.2	14.0	44.6	8.4	1,073	626	67	344	36
Twiggs	591.0	259.4	.	210.0	121.6	2,732	1,176		942	614
Union	508.3	36.2	46.3	48.0	377.8	2,345	381	118	272	1,574
Upson	159.3	76.8	.	22.5	60.0	1,311	711		214	386
Walker	195.3	64.3	.	33.1	97.9	1,918	530	6	199	1,183
Walton	124.0	39.2	.	36.8	48.0	768	274		226	268
Ware	812.7	585.2	178.5	49.0	.	4,047	2,834	580	568	65
Warren	169.5	71.1	.	46.8	51.6	1,242	565		282	395
Washington	553.4	210.6	2.0	148.2	192.6	3,165	1,316	7	847	995
Wayne	647.2	494.7	90.3	40.9	21.3	3,869	2,816	489	407	157
Webster	172.6	55.1	.	47.0	70.5	970	320		307	343
Wheeler	315.1	205.5	.	93.7	15.9	1,637	794		697	146
White	181.3	48.7	5.3	14.6	112.7	1,246	365	19	122	740
Whitfield	158.0	91.7	.	10.5	55.8	1,283	692		100	491
Wilcox	301.4	177.5	14.5	91.6	17.8	1,295	668	59	462	106
Wilkes	626.5	438.5	.	140.5	47.5	3,586	2,300	8	929	349
Wilkinson	696.3	274.2	52.4	203.8	165.9	3,218	988	171	1,253	806
Worth	335.1	268.1	.	43.5	23.5	1,526	1,085	13	285	143
Total	48,011.7	26,345.2	2,036.8	9,244.3	10,385.4	261,909	130,639	8,098	62,327	60,845

[1] Net volume, sound wood and bark.

WOOD · WATER · FORAGE · WILDLIFE · RECREATION
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

U. S. Forest Service Resource Bulletin SE-2 December 1963

Deer Browse Resources of North Georgia

CLEMSON COLLEGE LIBRARY
JAN 20

by

Thomas H. Ripley and Joe P. McClure

Forest Service - U.S. Department of Agriculture
Southeastern Forest Experiment Station
Asheville, North Carolina

ACKNOWLEDGMENTS

The completion of this inventory was made possible through direct cooperation between the U. S. Forest Service, Southeastern Forest Experiment Station; the Georgia National Forests; and the Georgia Game and Fish Commission. Cooperative work was planned under the auspices of the Forest Game Research Committee of the Southeastern Section of the Wildlife Society, C. W. Watson, Chairman.

Deer Browse Resources of North Georgia

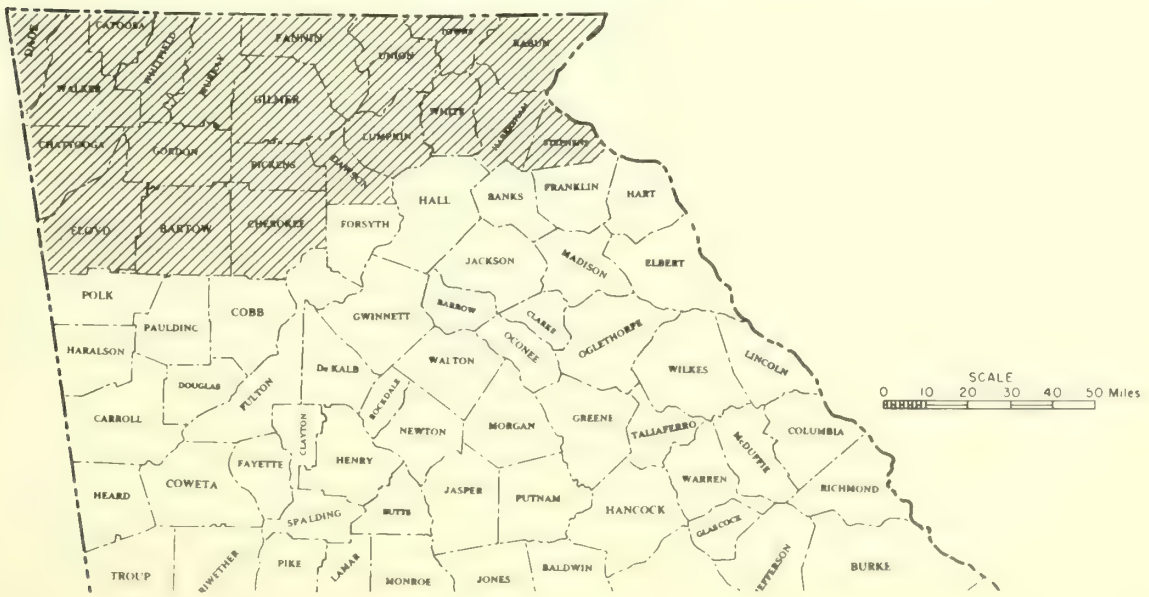
by

Thomas H. Ripley and Joe P. McClure

Following tests in the coastal plain and Piedmont of Georgia (Moore et al. 1960), a procedure was developed and used to assess browse resources in 21 counties of north Georgia involving a total land area of approximately 4 million acres (fig. 1). Although the Forest Survey is designed primarily to yield information on timber, it also provides an excellent sampling vehicle for measuring other forest resources. For example, West Virginia, working with the Northeastern Forest Experiment Station, obtained a statewide habitat map which has been of great value in managing wildlife resources (Wilson 1950). Similarly, Forest Survey teams at the Southern Station have sampled hydrologic conditions on a trial basis in Arkansas. Work in the Central States has been concurrent with our study (Ehrenreich 1962), and extensive sampling of deer forage resources has been completed.

That the Forest Survey will be repeated at regular intervals, probably every 7 to 10 years, to maintain continuing inventory of forest resource, is another important feature. Just as we are concerned with the total volume of timber that is available now or in the predictable future, we are also concerned with the amount of game habitat that is, and will be, available. Sampling for game habitat at regular intervals using permanent stations should yield good estimates of future resource potentials. Management efforts could be adjusted to trends that are clearly evident through repeated inventories of forage resources.

Figure 1.--Map of north Georgia. Hatching shows area sampled in browse survey.



Methods

Forest Survey crews were trained to recognize all important browse plants found in north Georgia. The species found are listed in table 1, together with the relative forage value preference rankings by one of four classes, the first two of which are considered desirable foods and the second two undesirable (from a forage standpoint).

Desirables

Preferred--Delicacies or "candy" species are the first species consumed by deer. These are usually highly nutritive.

Staple--Foundation or "bread and butter" species. These constitute the bulk of deer diet on good range. They are high in nutritive value and provide for normal animal weight gain and reproduction.

Undesirables

Emergency--Life-sustaining species. These provide a large part of the diet on overstocked ranges. They are generally low in nutritive value and produce little or no animal weight gain, and animal reproduction is usually low.

Stuffing--Starvation species. These plants have little or no food value. Animals continually lose weight and animal reproduction is very low, if they are a major part of the diet. Some may even be toxic.

Rankings used in this study are based on work by Ruff 1/ and Miller 2/ and field experience of biologists closely associated with the habits of white-tailed deer in the Southern Appalachians.

Sampling procedures used by the Forest Survey crews were followed and extended to obtain browse information. First, a cruise was completed to obtain sample tree descriptions, volume, growth, etc. of timber species in the overstory using a variable radius plot taken from a sample plot center. Then, the crew located 20 systematically spaced points to measure regeneration, competing vegetation, and obtain area description. Each of these points was inspected for the presence of browse-producing plants. The points sampled actually consisted of cylindrical plots 1 milacre in area and $4\frac{1}{2}$ feet high; the center of this cylinder was defined by the point.

1/ Ruff, Frederick J. The white-tailed deer of the Pisgah National Game Preserve. U. S. Dept. Agr., Forest Serv., South. Region, 249 pp. 1938.

2/ Miller, Howard A. Guide to timber management and wildlife coordination. U. S. Forest Serv., Region 8. 1959. (Rev. Nov. 1960.)

Table 1.--Important browse plants found in north Georgia, arranged by preference classes

DESIRABLE BROWSE	
Preferred:	
Buffalo-nut	Pyrularia pubera Michx.
Strawberry-bush	Euonymus americanus L.
Japanese honeysuckle	Lonicera japonica Thunb.
Greenbrier	Smilax spp.
Staple:	
Blackgum	Nyssa sylvatica Marsh.
Chestnut; chinkapin	Castanea spp.
Yellow-poplar	Liriodendron tulipifera L.
Sourwood	Oxydendrum arboreum (L.) DC.
Ash	Fraxinus
Maple	Acer rubrum L., A. saccharum L., A. negundo L.
Black locust	Robinia pseudoacacia L.
Dogwood	Cornus spp.
Viburnum	Viburnum spp.
Sassafras	Sassafras albidum (Nutt.) Nees
Willow	Salix spp.
Apple (domestic)	Malus spp.
Serviceberry	Amelanchier spp.
Azalea	Rhododendron spp. (deciduous species)
Sweet-shrub	Calycanthus floridus L.
Witch-hazel	Hamamelis virginiana L.
St. John's-Wort	Hypericum spp.
Fringetree	Chionanthus virginicus L.
Spicebush	Lindera benzoin (L.) Blume
Hydrangea	Hydrangea spp.
Redbay	Persea borbonia (L.) Spreng.
Bramble	Rubus spp.
Grape	Vitis spp.
UNDESIRABLE BROWSE	
Emergency:	
Mulberry	Morus spp.
Honeylocust	Gleditsia triacanthos L.
Cherry; plum	Prunus spp.
Hard maple	Acer saccharum Marsh., A. pensylvanicum L., A. spicatum Lam., A. leucoderme Small
Eastern cottonwood	Populus deltoides Bartr.
Basswood	Tilia spp.
Oak	Quercus spp.
Magnolia	Magnolia spp.
Eastern redbud	Cercis canadensis L.
Common persimmon	Diospyros virginiana L.
Birch	Betula spp.
Sweetgum	Liquidambar styraciflua L.
Tree-of-Heaven	Ailanthus altissima (Mill.) Swingle
Butternut	Juglans cinerea L.
Rhododendron	Rhododendron spp. (evergreen species)
Poison-ivy	Toxicodendron radicans
French-mulberry	Callicarpa americana L.
Sumac	Rhus spp.
Buckeye	Aesculus spp.
Doghobble	Leucothoe spp.
Cane	Arundinaria spp.
American elder	Sambucus canadensis L.
American mountain-ash	Sorbus americana Marsh.
Common sweetleaf	Symplocos tinctoria (L.) L'Her.
Mountain-laurel	Kalmia latifolia L.
Blueberry	Vaccinium spp.
Huckleberry	Gaylussacia spp.
Crossvine	Bignonia capreolata L.
Trumpet-creeper	Campsis radicans (L.) Seem.

Table 1. --Important browse plants found in north Georgia, arranged by preference classes (continued)

UNDESIRABLE	
Stuffing:	
Pine	Pinus spp.
Hemlock	Tsuga spp.
Spruce	Picea spp.
Fir	Abies spp.
Eastern redcedar	Juniperus virginiana L.
Atlantic white-cedar	Chamaecyparis thyoides (L.) B.S.P.
Northern white-cedar	Thuja occidentalis L.
American beech	Fagus grandifolia Ehrh.
Hackberry	Celtis spp.
Eastern hophornbeam	Ostrya virginiana (Mill.) K. Koch
Bluebeech	Carpinus caroliniana Walt.
Bigleaf snowbell (storax)	Styrax grandifolia Ait.
American sycamore	Platanus occidentalis L.
Black walnut	Juglans nigra L.
Silverbell	Halesia spp.
Hickory	Carya spp.
Elm	Ulmus spp.
Southern catalpa	Catalpa bignonioides Walt.
Chinaberry	Melia azedarach L.
Royal paulownia	Paulownia tomentosa (Thunb.) Sieb. & Zucc.
Hazelnut	Corylus spp.
American holly	Ilex opaca Ait.
Alder	Alnus spp.
Hawthorn	Crataegus spp.
Common buttonbush	Cephalanthus occidentalis L.
Pawpaw	Asimina triloba (L.) Dunal
New Jersey-tea	Ceanothus americanus L.
Virginia creeper	Parthenocissus quinquefolia (L.) Planch.

Three specific attributes of browse encountered at each point were recorded. First, all plants contributing to the browse supply in the cylindrical plot were examined, and the species contributing the most total weight during the winter season was tallied to characterize the point. The second attribute recorded was estimated weight, with estimates controlled by weekly, scheduled clippings to maintain crew accuracy. In this case, the observer estimated the total weight of browse present in the cylindrical plot as air-dried in a winter condition. In order to assist in both initial training and control of species identification and weight estimate, a series of photo standards were developed. Using scaled background, photographs of representative samples of clipped forage were pictured with the dry weight in a winter condition recorded immediately under the photograph (fig. 2). Standards for converting clipped samples of summer twig growth (used in weight estimate control) to comparable air-dried winter samples were used. The third attribute, that of use, was assessed by simply recording the presence or absence of any recognizable deer browsing activity.[3/] This assessment of utilization was not restricted to the current year's growth, but was recorded if recognizable at all.

During the period of sampling (May 18-August 1) there was little or no twig growth observed; accordingly, no attempt was made to adjust for increases in weight that occurred as the season progressed. Ehrenreich's observation (op. cit.) involving twig growth, applicable in the more northerly situations of Missouri, parallels ours. He found that current growth was complete by mid-June and that it was unneccssary to adjust clipped weights for similar samplings between June 19 and September 1.

3/ Although it is impossible to sort cattle and deer use, there is very little livestock grazing in the sample areas; hence, we disregarded this source and considered all use to be from deer.

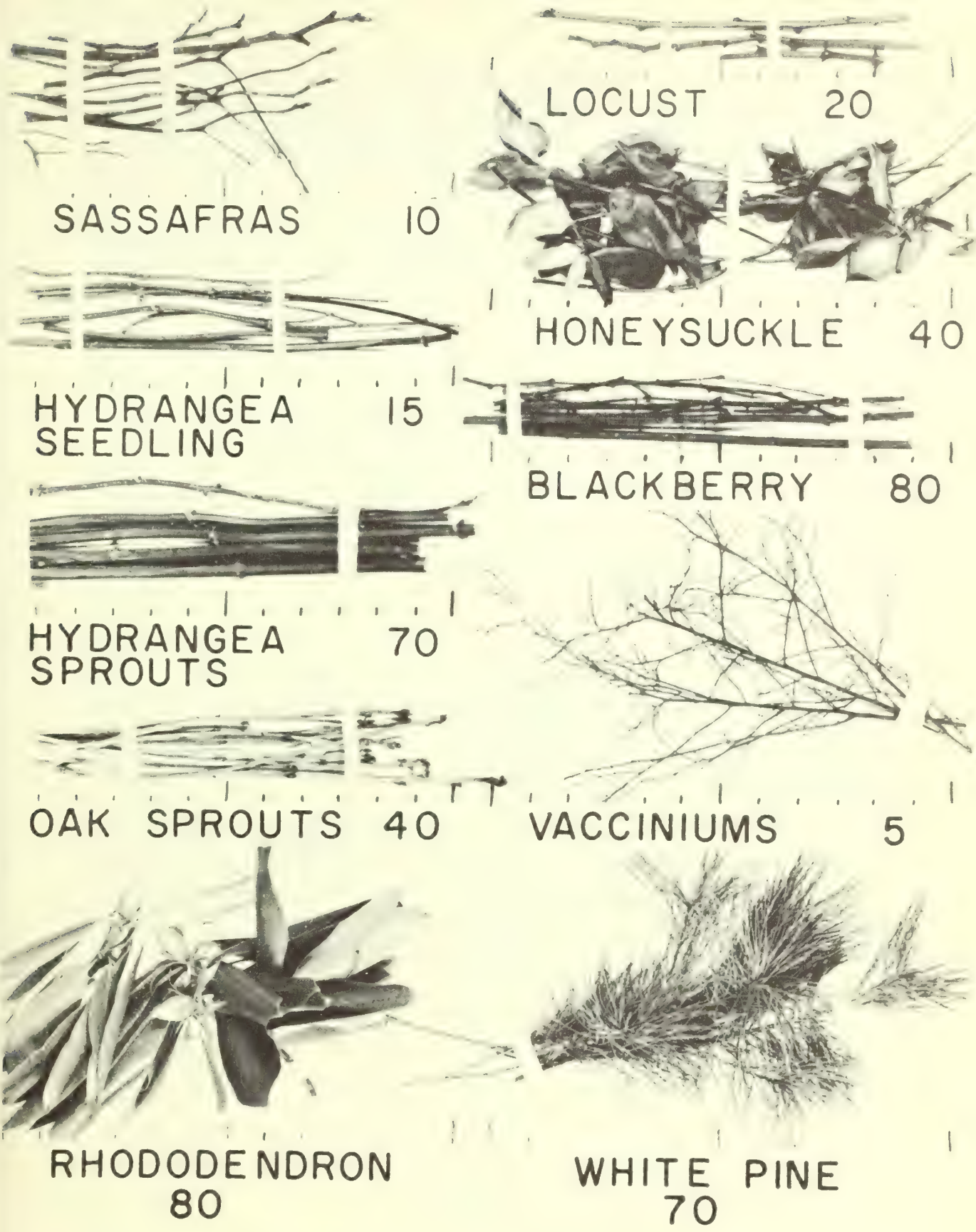


Figure 2.--Samples of clipped forage showing air-dried weight in winter condition.

Checks made on crew weight estimates prior to full-scale sampling indicated that errors rarely exceeded 10 percent. Considering that over-all intensity of sampling was generally low, and the high degree of variability in understory browse populations, the error incurred through observer estimates was considered negligible and probably (though contributing to variance) more or less compensating.

Eight hundred ninety-four plots, consisting of 17,880 points sampled on commercial forest lands, were used in this study. Approximately 20 percent were taken on the Chattahoochee National Forest with the remaining on private land, except for a small percentage from other public holdings.

Point sample data on dominant browse species and weight were summarized for each plot and punched, along with survey data, on a single plot card. Except for utilization summaries, all point data for each plot were averaged and viewed as a single observation (a cluster of plots). These, in turn, were used for summary and analysis of variance. We expect that the means reported here probably represent the most reliable estimate of central tendency at this sampling intensity. We think that errors computed from these systematic samplings would tend to be high; hence, we have elected to accept a probability of 90 percent as significant. In each case, however, we have shown the degree of probability if it exceeded 90 percent.

Findings and Discussion

Of the total 4,214,100 acres sampled in north Georgia, 3,284,600 acres were classed as commercial forests, based on Forest Survey classification of plots (table 2). Of this total, only 11,800 acres were not classed for the commercial production of forest products. Principal comparisons in this report deal with the 670,200 acres for National Forest and the total 2,570,600 acres for all private commercial forest land (table 3).

Table 2. --Area[1/] by land class, north Georgia, 1961 (21 counties)

(In thousand acres)

Land class	Area
Commercial forest land	3,272.8
Other forest land	11.8
Total forest land	3,284.6
Nonforest land	929.5
All land[2/]	4,214.1

1/ From U. S. Bureau of the Census, Land and Water Area of the United States, 1950.

2/ Adjusted to exclude 6,100 acres of water created since 1950.

Degree of utilization by preference classes and ownership were determined for all points sampled (table 4). Reported values for utilization were not tested for differences but indicate only that there is a general gradient of use from preferred to stuffing food.

Summary findings for occurrence and weight of "desirable" and "undesirable" browse are shown in figures 3 and 4 for all National Forest and other public land and all private commercial forest lands. Detailed findings for these and other breakdowns are in the appendix, together with statements of confidence or probability of difference.

Table 3. --Ownership distribution of commercial forest land in north Georgia, 1961 (21 counties)

(In thousand acres)

Ownership class	Area	Plots	Points	Percent
Federal:				
National Forest	670.2	180	3,600	20
Other public:				
Other Federal	24.7			
State	5.6			
County and municipal	1.7			
Total other public	32.0	26	520	3
Private:				
Forest industry:				
Pulp and paper	252.6			
Other wood-using industries	79.2			
Total forest industry	331.8			
Farmer-owned	1,391.9			
Miscellaneous private	846.9			
Total private	2,570.6	689	13,780	77
All ownerships	3,272.8	895	17,900	100

Table 4. --Degree of utilization on deer browse resources by preference classes and land ownerships in north Georgia

Preference class	Percent utilization (points browsed)			
	National Forest	Other public	Private	Total
Preferred	16.5	0	3.3	4.6
Staple	4.6	0	1.8	2.4
Emergency	3.7	1.3	2.3	2.7
Stuffing	3.7	0.9	0.7	1.1

Though based on meager samples, and relatively less important, "other public" lands apparently had more favorable browse conditions than National Forests or private land, and forage conditions generally appear more favorable on private lands than National Forests. This condition is probably caused by two principal factors: First, private lands are subject to much more frequent land use change with large acreages in high forage production during early stages of plant succession. Secondly, National Forests (though they include some highly productive timber lands) generally include a preponderance of marginal, low-site land which has been protected from major disturbance such as fire, clearing, heavy and repeated logging, and grazing.

Two forest types--pine, with 50 percent or more conifers, and hardwoods, with less than 50 percent conifers--were recognized (appendix tables 2, 5, and 6) to examine the relations between type and

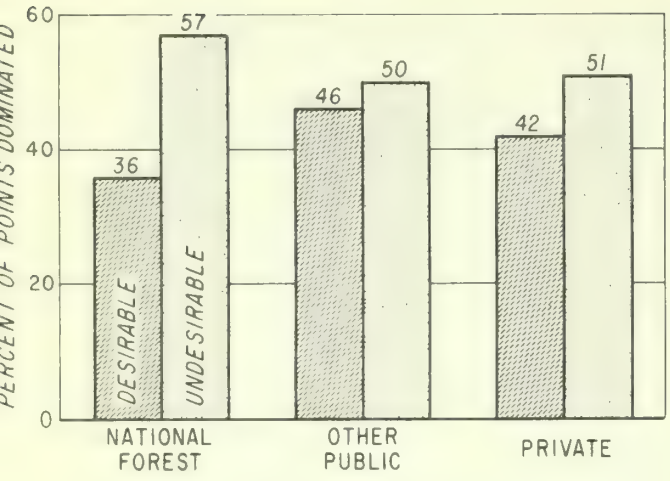


Figure 3.--Percent of points (per plot) dominated by desirable and undesirable deer browse for National Forest, other public, and private lands in north Georgia.

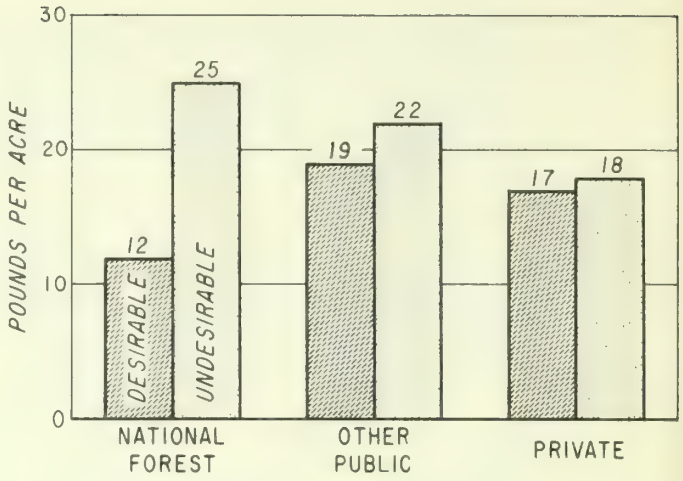


Figure 4.--Weight (air dried in winter condition) of desirable and undesirable deer browse on National Forest, other public, and private lands in north Georgia.

browse conditions. Pine-hardwoods and hardwood types representing approximately two-thirds of the acreage sampled were combined because differences between these types were not suspected to be important or meaningful. Although hardwood types occur without a conifer component, these are limited; and the preponderance of acreage in this combination has some conifers. Disregarding ownership the pine types had significantly greater weights of preferred browse (22 vs. 14 pounds per acre). It was suspected that type differences could be important especially on private lands with the more fertile old field sites on farms and on company holdings managed essentially for pure pine. No important weight differences could be seen between types on National Forests, but pine types were significantly higher on private lands. These are reflected in class differences shown in appendix tables 5 and 6 for these types. A higher percentage of points, however, were dominated by preferred browse in hardwoods than pine on National Forest lands. These differences probably reflect two major conditions which result in more desirable forage in pines on private lands. First, high, near-xeric ridges and west slopes on National Forest land support heavy volumes of low-quality browse, such as Kalmia and several species of poor quality Vacciniums. Secondly, on better sites, pine types probably were subject to more active disturbance by cutting and include a high percentage of areas in early stages of succession, especially on private land. These conditions may explain the apparently high total weight and lower quality of browse forage in pine types on National Forest lands and a contrasting lower weight and higher quality on private land. Though less striking, we suspect similar conditions prevail in the "hardwood" types where higher weights but poorer quality result from large quantities of less desirable browse on potentially poorer range or timber land.

It was thought that site might have an important relation to browse production and that this might be associated with type differences. Two strata of site were used: "good," producing an average pine, 80 or more feet tall and an

average hardwood with 2.5 or more logs; and "poor," supporting average pines less than 80 feet in total height or hardwoods with less than 2.5 logs. Over-all, better sites were dominated by more preferred browse even though weight differences were not significantly higher for preferred browse on good sites (appendix table 3). It is evident that good sites were dominated by higher quality browse, but that weights were more nearly equal on National Forest lands. Generally, the reverse was true with lower quality browse on poorer sites (see appendix tables 7 through 10). Again, we suspect this is due to contributions from low-quality forage on xeric or near-xeric sites.

Stand size, in this survey reflecting stem diameter, age, and density together, was thought to bear important relations to browse production. Analysis across all strata indicated, however, that only weight of desirable forage differed significantly, with 17 pounds per acre associated with seedling and pole sizes in contrast to 14 pounds for larger materials (see appendix table 4). Although limited observations in other strata failed to show size differences, it appeared that there may be differences on the pine types generally and in hardwoods on National Forest lands (appendix tables 11 through 18). On good pine sites on private land, both high weight and high quality browse were associated with small sawtimber and other larger and older trees--although not significantly (appendix table 16). We suspect that this results from broken canopies with large quantities of excellent browse, such as Japanese honeysuckle (Lonicera japonica). This condition was not indicated, however, on poor sites (appendix table 15). On all National Forest plots an expected reduction in weight of desirable browse and an associated reduction in number of points dominated by desirable forage were seen (except on poor hardwood sites in the latter case) as stand size increased. Although this was significant only for good hardwood sites, we suspect it reflects the effects of crown closure on understory forage supplies in all sites and types on National Forest lands.

Some general observations on carrying capacities seem reasonable at this point. Assuming that an average white-tail can be maintained on 2.5 pounds of desirable browse (preferred and staple plants) per day through approximately 100 days of a critical period, it will take a minimum of 250 pounds of forage to support each deer wintered over on these ranges. Further, if we also assume utilization of 40 percent to be a maximum allowable level, 625 pounds of desirable browse will be needed to carry each animal. It follows, then, that approximately 52 acres of National Forest and 33 acres of private lands would be needed to carry each white-tail (see appendix table 1). These acreage figures are certainly liberal for they do not include provisions for consumption of emergency foods which would reduce the acreage requirements for each deer.

Some tentative management implications may be seen in certain type, site, and stand size relations. In general, it seems that more favorable browse supplies are associated with the pine types. Especially on better sites, it may be that management leading to increased pine production is desirable or at least not apparently detrimental to browse supplies.

Clearly, better sites produce better browse (that is, a high percentage and total weight of desirable forage species). Hence, better sites should be favored for a measure to increase browse production. On National Forest lands particularly, reductions in quality browse were associated with advancing stand size, and this suggests that thinning of pole stands and frequent harvest cuttings in local ranges are desirable measures for improving forage production.

Summary

A sample of 894 plots and 17,880 points taken on forest land in 21 counties of north Georgia in conjunction with Forest Survey gave estimates of browse production heretofore unobtainable. Quality estimates of browse weight, stratified by ownerships, forest types, stand size, and site provide basic management data.

Utilization, as expected, was localized and confined largely to National Forest lands, where it ranged from 16.5 percent on preferred to 3.7 percent on stuffing species. Gradients of use (high to low) confirmed plant assignments in forage preference groupings used in the study.

Over-all, in north Georgia, an average of 36 pounds of browse forage was estimated, with 16 pounds from generally desirable browse plants and 20 pounds from plants providing emergency or stuffing foods. Of the major ownerships sampled, National Forests had less desirable forage (12 pounds) and more undesirable forage (25 pounds) than either private or other public lands, which had 19 and 22, and 17 and 18 pounds, respectively, for desirable and undesirable forage.

Examinations of site productivity and forest type showed generally better production on good sites in pine types. Stand size also affected forage conditions mainly in the pine types where best production was associated with small sawtimber. This is probably the result of canopy breaks and heavy production in local areas.

For all lands the average production of desirable forage on 39 acres can probably safely carry one deer if utilization is held to 40 percent. Requirements of 52 acres per deer would be liberal on National Forest lands, compared to 33 acres per deer on private lands. Reasonable consumption of emergency foods would reduce these acreage estimates substantially.

Management leading to increased pine production probably is not detrimental to forage supplies, especially if short rotations are used in conjunction with precommercial thinnings. It is apparent that any cultural work aimed at increasing browse production apparently will be more beneficial on better sites.

Literature Cited

Ehrenreich, John H., and Murphy, Dean A.
1962. A method of evaluating habitat for forest wildlife. Trans. 27th N. Amer. Wildlife & Natural Resources Conf., pp. 376-384.

Moore, William H., Ripley, Thomas H., and Clutter, Jerome L.
1960. Trials to determine relative deer range carrying capacity values in connection with the Georgia Forest Survey. 14th Ann. Conf. Proc., Southeast. Assoc. of Game & Fish Commrs., pp. 98-104.

Wilson, Lee
1950. State's major forest types. West Virginia Conservation 14 (4): 19-22.

APPENDIX

Table 1. --Frequency distribution and weight of deer browse forage resources by preference classes for land ownerships in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	National Forest n = 178 670,200 acres	Other public n = 26 32,000 acres	Private n = 690 2,570,600 acres	Probability of difference	National Forest n = 178 670,200 acres	Other public n = 26 32,000 acres	Private n = 690 2,570,600 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable 1/	36	46	42	0.975	12	19	17	0.975
Total undesirable 2/	57	50	51	0.990	25	22	18	0.990
Unknown plants	1	0	1	n. s.	0	0	0	n. s.
No browse	6	4	6	n. s.	0	0	0	n. s.
Totals	100	100	100	--	37	41	35	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 2. --Frequency distribution and weight of deer browse forage resources by preference classes for forest types in north Georgia

Preference class	Distribution of points by preference classes			Forage weight		
	Pine n = 283 103,606 acres	Hardwood n = 611 2,236,871 acres	Probability of difference	Pine n = 283 103,606 acres	Hardwood n = 611 2,236,871 acres	Probability of difference
	- - Percent - -			Pounds per acre		
Total desirable 1/	43	41	n. s.	22	14	0.995
Total undesirable 2/	49	53	0.900	20	19	0.990
Unknown plants	1	1	n. s.	0	0	0.900
No browse	7	5	0.995	0	0	n. s.
Totals	100	100	--	42	33	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 3. --Frequency distribution and weight of deer browse forage resources by preference classes for sites in north Georgia

Preference class	Distribution of points by preference classes			Forage weight		
	Poor site n = 720 2,635,920 acres	Good site n = 174 637,014 acres	Probability of difference	Poor site n = 720 2,635,920 acres	Good site n = 174 637,014 acres	Probability of difference
	- - Percent - -			Pounds per acre		
Total desirable 1/	39	53	0.995	16	20	n. s.
Total undesirable 2/	55	39	0.995	20	13	n. s.
Unknown plants	1	1	n. s.	0	0	n. s.
No browse	5	7	n. s.	0	0	n. s.
Totals	100	100	--	36	33	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 4. --Frequency distribution and weight of deer browse forage resources by preference classes for stand sizes in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 623 2,280,803 acres	Sawtimber n = 271 992,131 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 623 2,280,803 acres	Sawtimber n = 271 992,131 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable 1/	--	40	43	n. s.	--	17	14	0.995
Total undesirable 2/	--	54	50	n. s.	--	20	18	n. s.
Unknown plants	--	1	1	n. s.	--	0	0	n. s.
No browse	--	5	6	n. s.	--	0	0	n. s.
Totals	--	100	100	--	--	37	32	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 5. --Frequency distribution and weight of deer browse forage resources by preference classes for forest types on National Forest lands in north Georgia

Preference class	Distribution of points by preference classes			Forage weight		
	Pine n = 29 109,185 acres	Hardwood n = 149 560,985 acres	Probability of difference	Pine n = 29 109,185 acres	Hardwood n = 149 560,985 acres	Probability of difference
	- - Percent - -			Pounds per acre		
Total desirable 1/	28	38	0.900	10	12	n. s.
Total undesirable 2/	66	55	0.950	35	23	n. s.
Unknown plants	0	1	n. s.	1	0	n. s.
No browse	6	6	n. s.	0	0	n. s.
Totals	100	100	--	46	35	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 6. --Frequency distribution and weight of deer browse forage resources by preference classes for forest types on private lands in north Georgia

Preference class	Distribution of points by preference classes			Forage weight		
	Pine n = 244 909,144 acres	Hardwood n = 446 1,661,796 acres	Probability of difference	Pine n = 244 909,144 acres	Hardwood n = 446 1,661,796 acres	Probability of difference
	- - Percent - -			Pounds per acre		
Total desirable 1/	44	42	n. s.	23	15	0.995
Total undesirable 2/	47	53	0.975	18	17	0.990
Unknown plants	1	1	n. s.	0	0	0.900
No browse	8	4	0.995	0	0	n. s.
Totals	100	100	--	41	32	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 7. --Frequency distribution and weight of deer browse forage resources by preference classes for sites on pine types on National Forest lands in north Georgia

Preference class	Distribution of points by preference classes			Forage weight		
	Poor n = 24 90,360 acres	Good n = 5 18,825 acres	Probability of difference	Poor n = 24 90,360 acres	Good n = 5 18,825 acres	Probability of difference
	- - Percent - -			Pounds per acre		
Total desirable 1/	24	43	0.900	9	10	n. s.
Total undesirable 2/	71	43	0.950	38	18	n. s.
Unknown plants	0	1	n. s.	1	0	n. s.
No browse	5	13	n. s.	0	0	n. s.
Totals	100	100	--	48	28	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 8. --Frequency distribution and weight of deer browse forage resources by preference classes for sites on hardwood types on National Forest lands in north Georgia

Preference class	Distribution of points by preference classes			Forage weight		
	Poor n = 104 391,560 acres	Good n = 45 169,425 acres	Probability of difference	Poor n = 104 391,560 acres	Good n = 45 169,425 acres	Probability of difference
	- - Percent - -			Pounds per acre		
Total desirable 1/	36	43	0.900	12	13	n. s.
Total undesirable 2/	57	49	n. s.	25	18	n. s.
Unknown plants	1	1	n. s.	0	1	0.900
No browse	6	7	n. s.	0	0	n. s.
Totals	100	100	--	37	32	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 9. --Frequency distribution and weight of deer browse forage resources by preference classes for sites on pine types on private lands in north Georgia

Preference class	Distribution of points by preference classes			Forage weight		
	Poor n = 210 782,460 acres	Good n = 34 126,684 acres	Probability of difference	Poor n = 210 782,460 acres	Good n = 34 126,684 acres	Probability of difference
	-- Percent --			Pounds per acre		
Total desirable 1/	42	56	0.995	22	29	n. s.
Total undesirable 2/	49	36	0.975	19	14	n. s.
Unknown plants	1	1	n. s.	0	0	n. s.
No browse	8	7	n. s.	0	0	n. s.
Totals	100	100	--	41	43	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 10. --Frequency distribution and weight of deer browse forage resources by preference classes for sites on hardwood types on private lands in north Georgia

Preference class	Distribution of points by preference classes			Forage weight		
	Poor n = 360 1,341,360 acres	Good n = 86 320,436 acres	Probability of difference	Poor n = 360 1,341,360 acres	Good n = 86 320,436 acres	Probability of difference
	- - Percent - -			Pounds per acre		
Total desirable 1/	38	57	0.995	13	20	n. s.
Total undesirable 2/	57	36	0.995	19	11	n. s.
Unknown plants	1	1	n. s.	0	0	n. s.
No browse	4	6	n. s.	0	0	n. s.
Totals	100	100	--	32	31	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 11. --Frequency distribution and weight of deer browse forage resources by preference classes and stand sizes for poor sites on pine types on National Forest lands in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 7 26,355 acres	Sawtimber n = 17 64,005 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 7 26,355 acres	Sawtimber n = 17 64,005 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable 1/	--	31	21	n.s.	--	14	7	n.s.
Total undesirable 2/	--	62	75	n.s.	--	29	43	n.s.
Unknown plants	--	1	0	n.s.	--	1	0	n.s.
No browse	--	6	4	n.s.	--	0	0	n.s.
Totals	--	100	100	--	--	44	50	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 12. --Frequency distribution and weight of deer browse forage resources by preference classes and stand sizes for good sites on pine types on National Forest lands in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 2 7,530 acres	Sawtimber n = 3 11,295 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 2 7,530 acres	Sawtimber n = 3 11,295 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable 1/	--	60	32	n.s.	--	20	5	n.s.
Total undesirable 2/	--	38	46	n.s.	--	25	17	n.s.
Unknown plants	--	0	2	n.s.	--	0	0	n.s.
No browse	--	2	20	n.s.	--	0	0	n.s.
Totals	--	100	100	--	--	45	22	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 13. --Frequency distribution and weight of deer browse forage resources by preference classes and stand sizes for poor sites on hardwood types on National Forest lands in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 52 195,780 acres	Sawtimber n = 52 195,780 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 52 195,780 acres	Sawtimber n = 52 195,780 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable [1]	--	35	36	n.s.	--	13	10	n.s.
Total undesirable [2]	--	57	59	n.s.	--	28	21	n.s.
Unknown plants	--	2	0	n.s.	--	0	0	n.s.
No browse	--	6	5	n.s.	--	0	0	n.s.
Totals	--	100	100	--	--	41	31	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 14. --Frequency distribution and weight of deer browse forage resources by preference classes and stand sizes for good sites on hardwood types on National Forest lands in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 12 45,180 acres	Sawtimber n = 33 124,245 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 12 45,180 acres	Sawtimber n = 33 124,245 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable [1]	--	65	36	0.950	--	28	9	0.900
Total undesirable [2]	--	30	55	0.900	--	8	22	n.s.
Unknown plants	--	1	1	n.s.	--	1	0	n.s.
No browse	--	4	8	n.s.	--	0	0	n.s.
Totals	--	100	100	--	--	37	31	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 15. --Frequency distribution and weight of deer browse forage resources by preference classes and stand sizes for poor sites on pine types on private lands in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 177 659,502 acres	Sawtimber n = 33 122,958 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 177 659,502 acres	Sawtimber n = 33 122,958 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable 1/	--	41	50	n.s.	--	23	16	0.950
Total undesirable 2/	--	51	40	n.s.	--	20	12	n.s.
Unknown plants	--	1	0	n.s.	--	0	0	n.s.
No browse	--	7	10	n.s.	--	0	0	n.s.
Totals	--	100	100	--	--	43	28	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 16. --Frequency distribution and weight of deer browse forage resources by preference classes and stand sizes for good sites on pine types on private lands in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 21 78,246 acres	Sawtimber n = 13 48,438 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 21 78,246 acres	Sawtimber n = 13 48,438 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable 1/	--	48	68	n.s.	--	20	46	n.s.
Total undesirable 2/	--	40	30	n.s.	--	16	12	n.s.
Unknown plants	--	1	0	n.s.	--	0	0	n.s.
No browse	--	11	2	n.s.	--	0	0	n.s.
Totals	--	100	100	--	--	36	58	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 17. --Frequency distribution and weight of deer browse forage resources by preference classes and stand sizes for poor sites on hardwood types on private lands in north Georgia

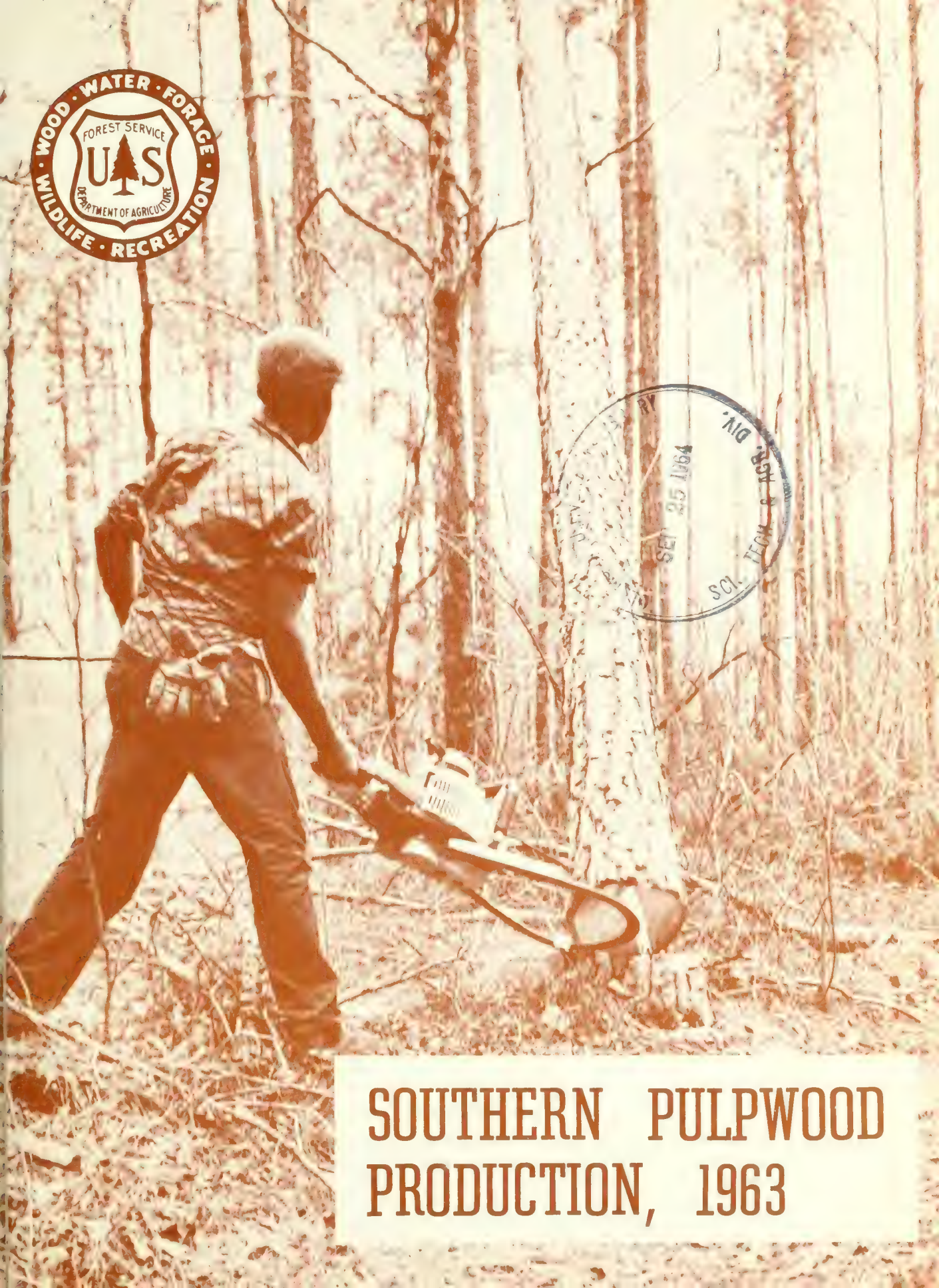
Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 292 1,087,992 acres	Sawtimber n = 68 253,368 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 292 1,087,992 acres	Sawtimber n = 68 253,368 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable 1/	--	37	42	n. s.	--	13	13	n. s.
Total undesirable 2/	--	58	53	n. s.	--	20	14	n. s.
Unknown plants	--	1	1	n. s.	--	0	0	n. s.
No browse	--	4	4	n. s.	--	0	0	n. s.
Totals	--	100	100	--	--	33	27	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.

Table 18. --Frequency distribution and weight of deer browse forage resources by preference classes and stand sizes for good sites on hardwood types on private lands in north Georgia

Preference class	Distribution of points by preference classes				Forage weight			
	Nonstocked n = 0	Seedlings-Poles n = 45 167,670 acres	Sawtimber n = 41 152,766 acres	Probability of difference	Nonstocked n = 0	Seedlings-Poles n = 45 167,670 acres	Sawtimber n = 41 152,766 acres	Probability of difference
	- - - - Percent - - - -				- - Pounds per acre - -			
Total desirable 1/	--	57	57	n. s.	--	20	21	n. s.
Total undesirable 2/	--	38	35	n. s.	--	12	10	n. s.
Unknown plants	--	1	1	n. s.	--	0	0	n. s.
No browse	--	4	7	n. s.	--	0	0	n. s.
Totals	--	100	100	--	--	32	31	--

1/ Includes preferred and staple foods.
2/ Includes emergency and stuffing foods.



SEP 25 1964
SCI. TECH. DIV.

SOUTHERN PULPWOOD PRODUCTION, 1963

In this report:

	Page
SOUTHERN PULPWOOD PRODUCTION BY—	
—State	1,2
—species group	2
—county	5,6,14-24
—roundwood and residues	13
—territory	14
A TEN-YEAR REVIEW OF—	
—capacity	2
—production	3
—wood residues	3
—mill procurement patterns	4
OUTLOOK	4
PULP COMPANIES USING SOUTHERN WOOD	7,8
PULPMILLS USING SOUTHERN WOOD BY—	
—capacity and location	11,25,26
—process and location	12,25,26
MAP OF SOUTHERN COUNTIES AND FOREST SURVEY UNITS	9

Frontispiece photo courtesy of International Paper Company

SOUTHERN PULPWOOD PRODUCTION, 1963

Herbert A. Knight
and
Agnes C. Nichols

SOUTHEASTERN FOREST EXPERIMENT STATION
Asheville, North Carolina
and
SOUTHERN FOREST EXPERIMENT STATION
New Orleans, Louisiana
of the
Forest Service, U. S. Department of Agriculture
in cooperation with
SOUTHERN PULPWOOD CONSERVATION ASSOCIATION
Atlanta, Georgia

1964

PULPWOOD PRODUCTION IN THE SOUTH climbed to a fifth consecutive alltime high of 26,590,997 cords in 1963—60 percent of the Nation's total. At year's end, the 81 southern pulpmills had a daily pulping capacity exceeding 54,000 tons. Nine additional mills from outside the region drew wood from the South in 1963.

When both roundwood and residues are included, the South produced 4 percent more pulpwood in 1963 than in 1962. Georgia again continued to lead the region in total production with over 5.5 million cords. Nine of the twelve southern states reported increases over the previous year; the largest increase, 12 percent, occurred in Louisiana. The largest decline, 5 percent, was in Mississippi, and production was off slightly in South Carolina and Tennessee (table 1).

Eighty-four percent of the pulpwood production was in the form of roundwood, with plant wood residues accounting for the rest. Roundwood volume totaled 22,329 thousand cords, a 3-percent gain over 1962. The equivalent of 4,262 thousand cords of residues was supplied by sawmills and other primary wood-using plants in the South, representing an 11-percent increase in the use of residues for pulpwood over 1962.

Table 1. *Pulpwood production in the South during 1963, and change since 1962*

State	Round pulpwood and residues	Change
	Thousand cords	*Percent*
Alabama	3,649.8	+ 6
Arkansas	1,850.4	+ 7
Florida	2,527.9	+ 3
Georgia	5,520.4	+ 6
Louisiana	2,238.2	+12
Mississippi	1,993.2	— 5
North Carolina	2,422.9	+ 4
Oklahoma	64.6	+ 9
South Carolina	2,463.2	— 1
Tennessee	426.7	— 1
Texas	1,443.6	+ 1
Virginia	1,990.1	+ 5
All states	26,591.0	+ 4

The upward trend in the use of hardwood by the pulp industry continued. When wood residues are included, 22 percent of the southern pulpwood supply came from hardwoods. Although the popularity of the gums is still in evidence, use of hard hardwood species for pulpwood is increasing and now comprises one-third of total hardwood production (table 2).

The southern pulp industry is heavily oriented toward the production of kraft, with over 77 percent of the region's pulping capacity designed to use the sulfate process. In addition, there were three new kraft mills under construction at the end of the year. The sulfate mills process most of the pine and soft-textured hardwood pulpwood cut in the South.

A large share of the oaks and other firm-textured hardwoods are consumed by mills using the semichemical process, although the sulfate mills are buying an increasingly higher percent of these hard hardwoods.

Large volumes of pulpwood, mostly pine, were again harvested from southeast Georgia and northeast Florida. The harvest exceeded 100,000 cords in 11 of the counties within this area, with 166,315 cords cut in Clinch County, Georgia. Two other extensive pine-producing areas encompass southern Arkansas-northern Louisiana, and the Georgia-South Carolina

Table 2. *Round pulpwood production in the South, by State and species group, 1963* [1]

State	All species	Pine	Soft hardwoods				Hard hardwoods			Total hardwoods
			Gums	Yellow-poplar, cottonwood, willow, magnolia, basswood, and boxelder	Elm, hackberry, and sycamore	Total soft hardwoods	Oaks	Other hardwoods	Total hard hardwoods	
	Thousand cords									
Alabama	3,014.1	2,325.1	400.6	107.8	43.9	552.3	91.5	45.2	136.7	689.0
Arkansas	1,372.1	1,003.1	211.9	53.6	12.8	278.3	88.1	2.6	90.7	369.0
Florida	2,289.0	2,121.6	88.9	35.0	.6	124.5	37.3	5.6	42.9	167.4
Georgia	4,800.7	4,269.8	326.7	39.5	7.2	373.4	135.1	22.4	157.5	530.9
Louisiana	1,968.5	1,503.0	265.9	67.3	15.2	348.4	102.8	14.3	117.1	465.5
Mississippi	1,706.2	683.2	666.8	154.8	65.2	886.8	66.4	69.8	136.2	1,023.0
North Carolina	1,898.2	1,439.1	115.1	80.0	18.8	213.9	202.8	42.4	245.2	459.1
Oklahoma	25.2	6.5	5.6	5.5	2.5	13.6	5.0	.1	5.1	18.7
South Carolina	2,024.3	1,509.3	263.2	89.0	26.8	379.0	98.8	37.2	136.0	515.0
Tennessee	395.8	198.6	14.8	17.3	6.0	38.1	145.5	13.6	159.1	197.2
Texas	1,063.0	820.3	221.5	3.8	.7	226.0	16.5	.2	16.7	242.7
Virginia	1,772.0	1,235.5	51.7	63.9	2.9	118.5	365.4	52.6	418.0	536.5
All states	22,329.1	17,115.1	2,632.7	717.5	202.6	3,552.8	1,355.2	306.0	1,661.2	5,214.0

[1] The finer hardwood species breakdowns are based largely on estimates by the companies.

Piedmont. Large volumes of hardwood as well as pine were cut for pulpwood in southwest Alabama. Baldwin County, Alabama, with a 226,566-cord harvest, again led all counties in the entire South in pulpwood production. Southern Mississippi and the Appalachian Mountains supply a large share of our hardwood pulpwood. Over one-half of the pulpwood produced in Mississippi and Tennessee in 1963 was hardwood (fig. 1).

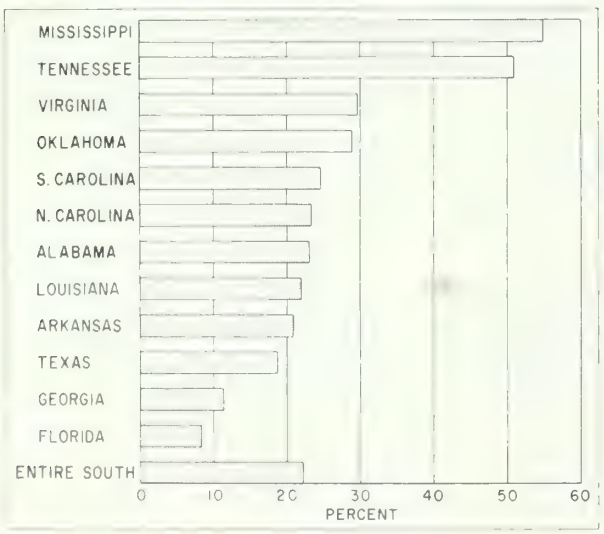


Figure 1. *Portion of total pulpwood production obtained from hardwood, 1963.*

A TEN-YEAR REVIEW

Several significant trends have developed in the southern pulpwood industry during the past 10 years. Relatively stable economic conditions have prevailed since the end of the Korean War; therefore, these trends should reflect normal growth within an expanding peacetime economy. A rapid rise in our population, together with an increase in the per capita consumption of paper, paperboard, and other nonpaper products of pulpwood, have been conducive to expansion throughout the industry.

Capacity

The combined daily capacity of the southern pulpmills increased from 28,670 tons in 1953 to 54,222 tons in 1963. About 43 percent of this increase can be attributed to the construction and subsequent expansion of new mills. The remaining increase has been in the form of expansion and modernization projects at existing installations. Major increases occurred at 2-year intervals between 1953 and 1960 (fig. 2). During 1961 and 1962 there was relatively

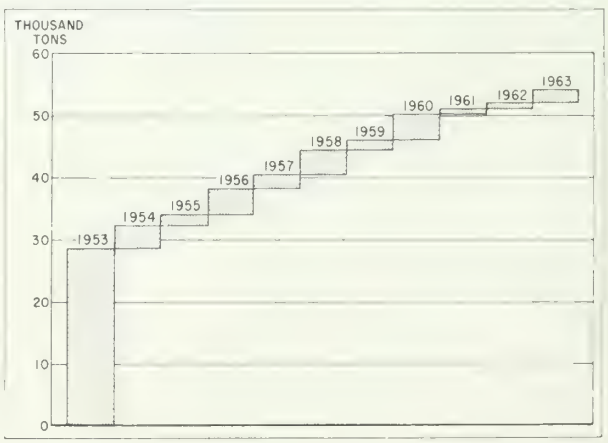


Figure 2. *Daily pulping capacity of southern mills, with annual increases, 1953-1963.*

modest expansion. One new mill began operations in 1963, and three others were under construction at the end of the year. In addition, a number of the southern mills are presently expanding their existing facilities. Over the entire 10-year period, about one-half of the total expansion has taken place in Georgia, Florida, and Alabama (fig. 3).

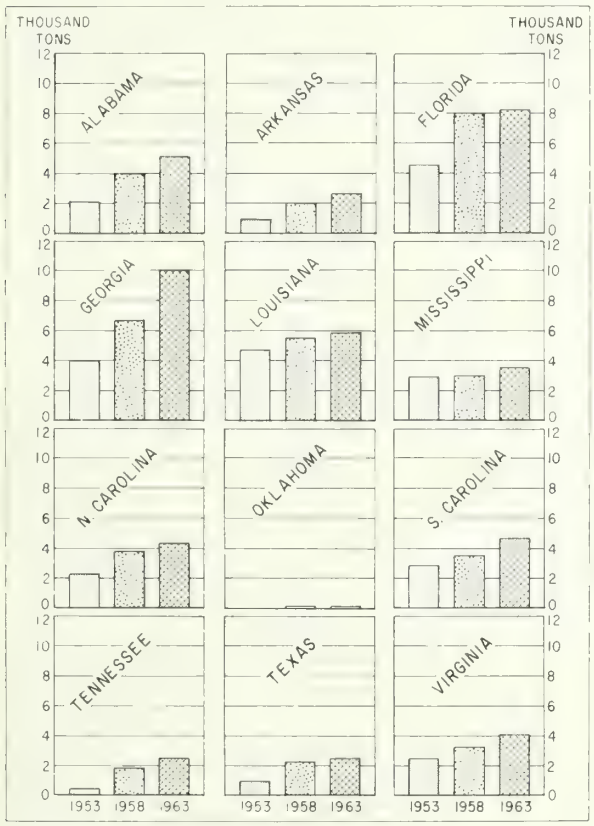


Figure 3. *Daily pulping capacity in the South by State, 1953-1963.*

Production

Annual pulpwood production in the South rose from 16.2 million cords in 1953 to 26.6 million cords in 1963—an increase of 64 percent (fig. 4). With the exceptions of 1957, a recession year, and 1958, a year of recovery, a new alltime production record was set each succeeding year since 1953.

Pine roundwood production showed an overall increase of 21 percent during this interval, but has remained comparatively stable since 1959. In fact, pine roundwood expressed as a percent of total production has declined over the entire 10-year period. In 1953, pine roundwood supplied 87 percent of the total southern pulpwood production volume. By 1963, it comprised only 64 percent. This decline of pine roundwood as a percent of total wood used is encouraging, for it indicates a trend toward fuller utilization of wood residues as well as the available hardwood resources in the South.

Over the same period, hardwood roundwood production has climbed from slightly less than 2 million cords to over 5 million cords. Although this increase has not been as spectacular as the increased use of wood residues, it is probably a more important trend. This is especially true now that the discovery of new techniques and production methods enables the pulp industry to use sizable quantities of firm-textured hardwood species. A better balance between the use of hardwood and softwood species for pulpwood could exert a favorable influence on timber management in the region. Although the popularity of southern yellow pine will certainly continue its dominating influence on timber management in the South, the management of hardwood species on short-term rotations for pulpwood deserves more attention.

Wood Residues

The progress made in the utilization of wood residues for pulpwood in the South during the past decade is pointed out in figure 4. With the decline in use of these residues for fuel, their disposition began to focus on the pulp industry about 1953. As a result, debarkers

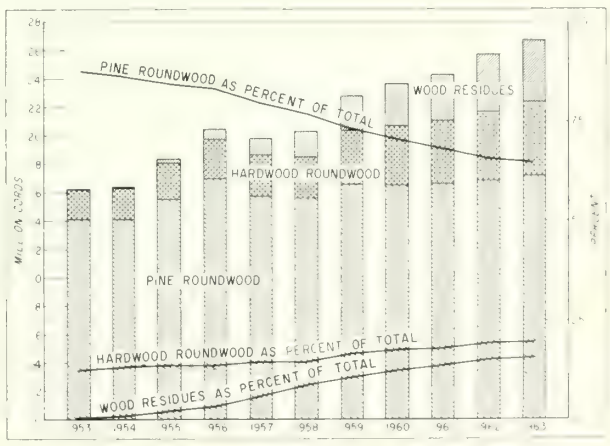

PINE ROUNDWOOD AS PERCENT OF TOTAL
WOOD RESIDUES
HARDWOOD ROUNDWOOD
PINE ROUNDWOOD
HARDWOOD ROUNDWOOD AS PERCENT OF TOTAL
WOOD RESIDUES AS PERCENT OF TOTAL

Figure 4. *Ten-year pulpwood production in the South.*

and chipping facilities are now commonly found at sawmills and veneer plants throughout the region. The use of wood residues for pulpwood soared from 76,000 cords in 1953 to slightly over 4 million cords in 1963.

Sawmills provide the bulk of residue material from their slabs and edgings. Sizable quantities of hardwood chips are obtained from veneer cores. In addition, many veneer mills have installed a second chipper for their roundup and clip waste.

Mill Procurement Patterns

The number of counties from which four or more mills draw pine roundwood has steadily decreased since 1959. This indicates that some of the mills are drawing in their pine procurement territories. Most of the companies have brought large land acreages under their control within the vicinities of their plants to protect their investments, and both land acquisitions and long-term leases have been used. Improved timber management on these company lands is increasing pulpwood production near the mills. Continuing expansion of existing pulping facilities, however, tends to offset part of the ability of the companies to grow a larger percentage of their own pulpwood. Also, a larger percent of the wood supply is coming from the wood residues of other primary wood users. A few years ago large quantities of nearby residues were passed up in the quest for roundwood. In addition, most of the companies are now using sizable quantities of hardwood. Nearby hardwoods were also overlooked in search of pine to feed the mills. The availability of these hardwoods, especially on company lands, helped speed up the introduction of new techniques which made their use more common.

In recent years a greater percent of the pulpwood cut in the South has been trucked directly to the mills. The dependable and well-equipped producer has emerged and is relied upon to provide a more stable wood supply, resulting in a smaller percent of the wood being shipped from rail sidings. Attempts have been made to reduce transportation costs, such as eliminating rail shipments that require two railroads. As the use of hardwood increases, its procurement seems to be tending toward a pattern similar to that for pine. The number of counties from which four or more mills draw hardwood roundwood reached a peak in 1960.

OUTLOOK

Various studies indicate that our population may reach 350 million people by the end of this century. Projections of prospective demands for timber products show that the consumption of pulp, paper, and board may triple by the year 2000. Inevitably, the southern pulpwood industry will play a leading role in supplying such a demand.

Pressure will continue on the pulpwood producer to reduce costs. He will have to depend upon the development of improved harvesting techniques to replace or make more efficient the traditional short-stick pulpwood harvest operation. Tree-length barking and chipping equipment is being installed at one of the new mills now under construction. Decentralized roundwood chipping installations are now found in a few areas and could become more popular.

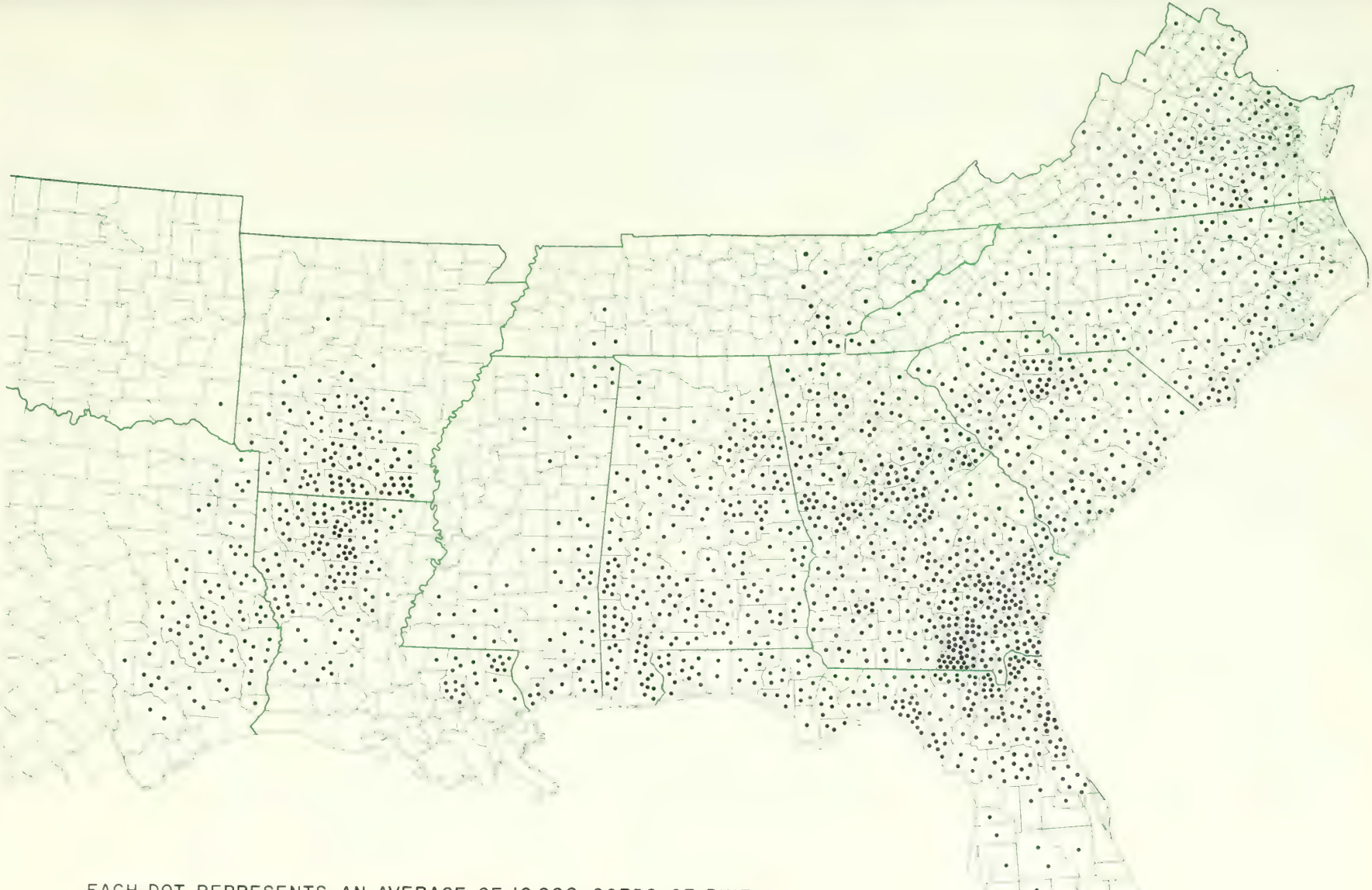


Figure 5. *Pine roundwood production by county, 1963.*

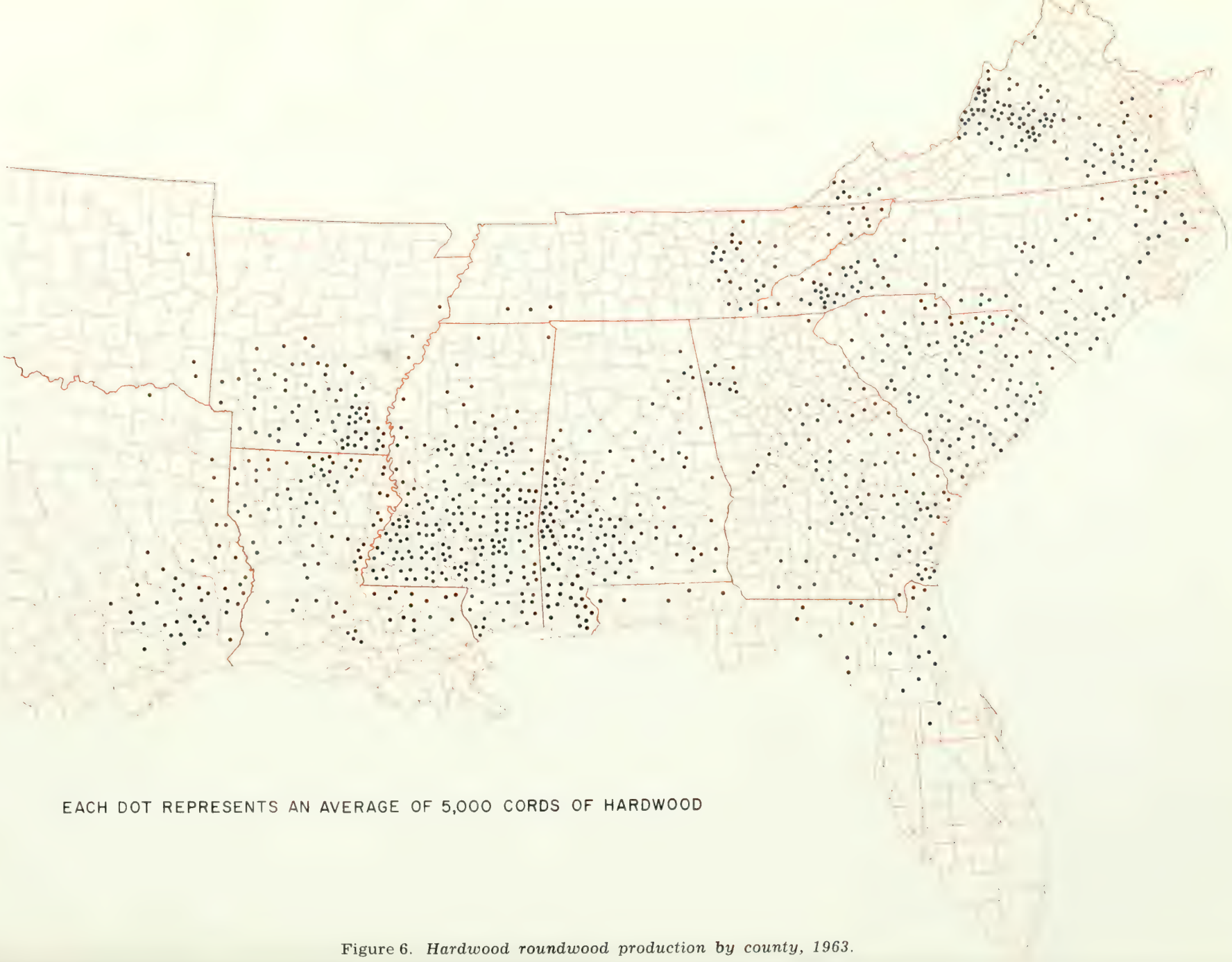


Figure 6. *Hardwood roundwood production by county, 1963.*

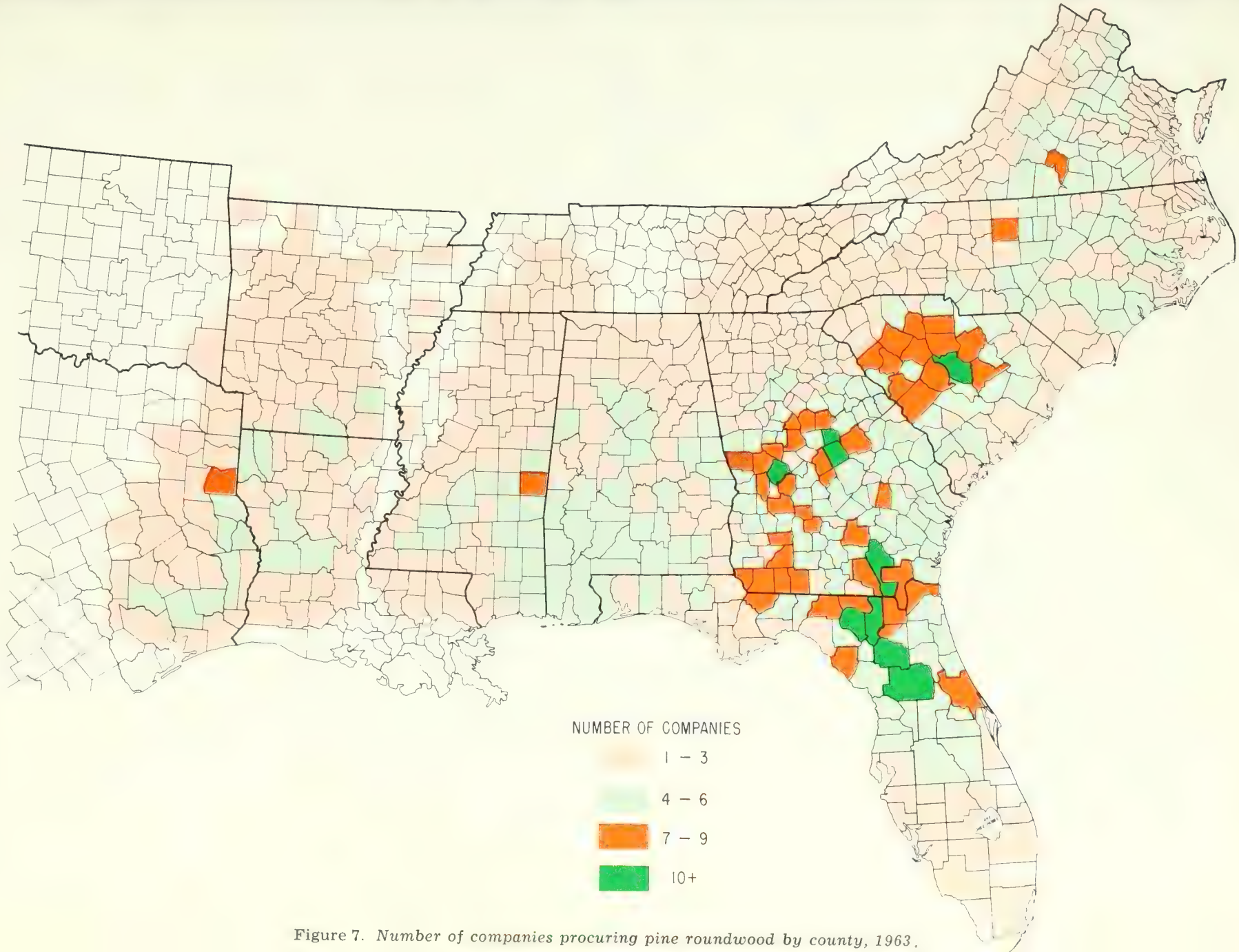


Figure 7. *Number of companies procuring pine roundwood by county, 1963.*

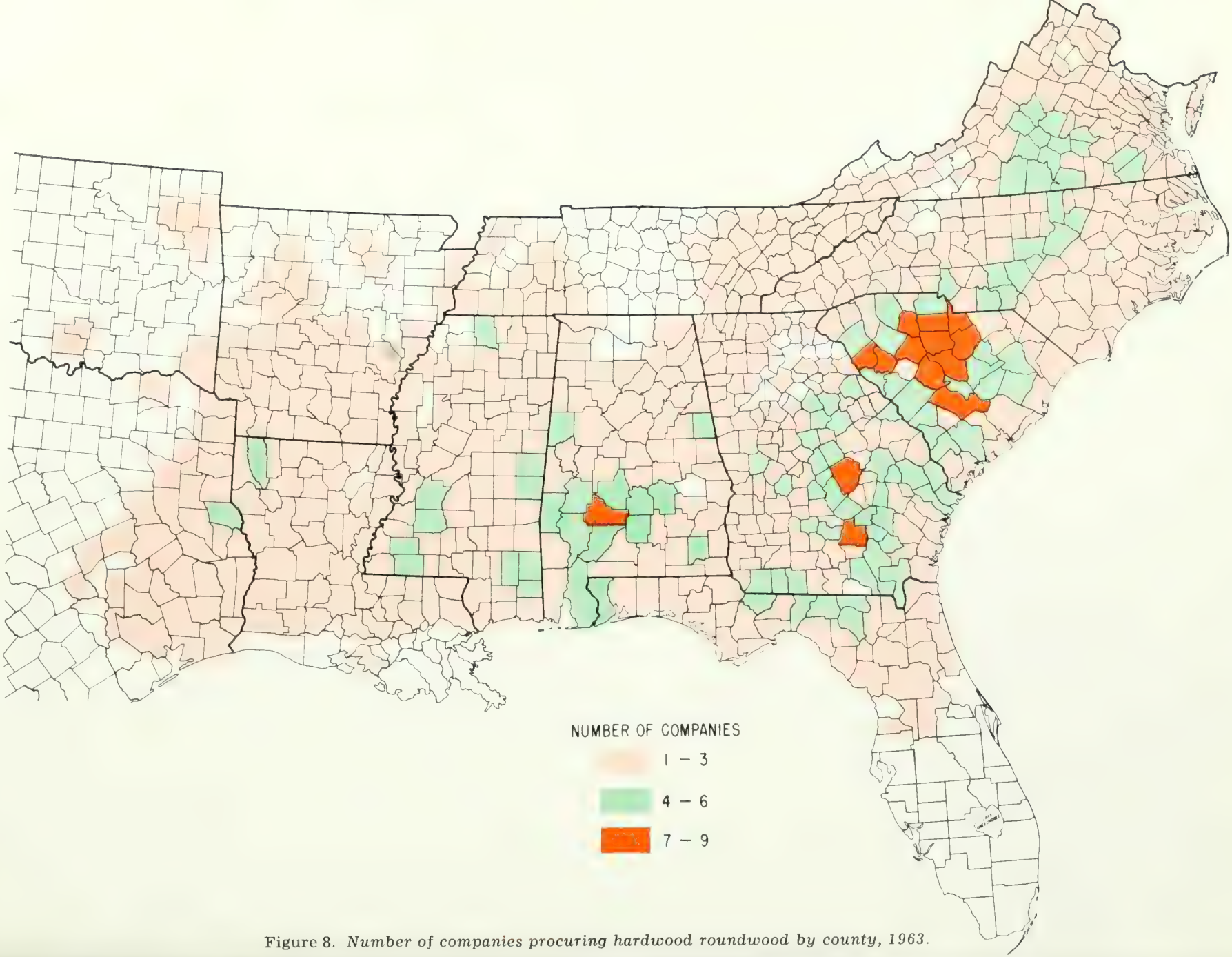


Figure 8. *Number of companies procuring hardwood roundwood by county, 1963.*

Figure 10. *Mills using southern pulpwood in 1963, and those under construction. The areas delineated within states are Forest Survey regions. Small numbers at mill locations correspond to numbers in table 19.*

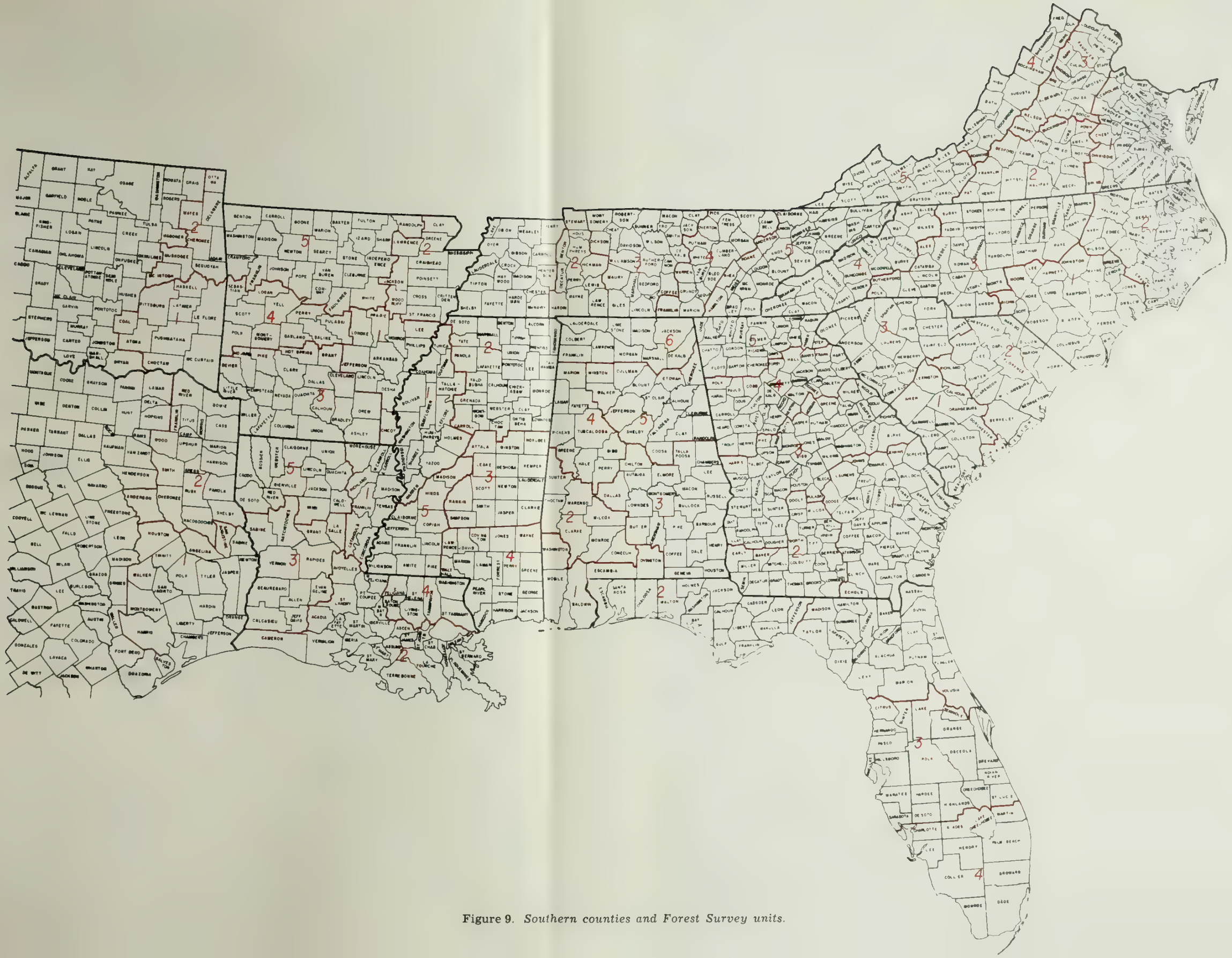


Figure 9. *Southern counties and Forest Survey units.*

Figure 10. *Mills using southern pulpwood in 1963, and those under construction. The areas delineated within states are Forest Survey regions. Small numbers at mill locations correspond to numbers in table 19.*

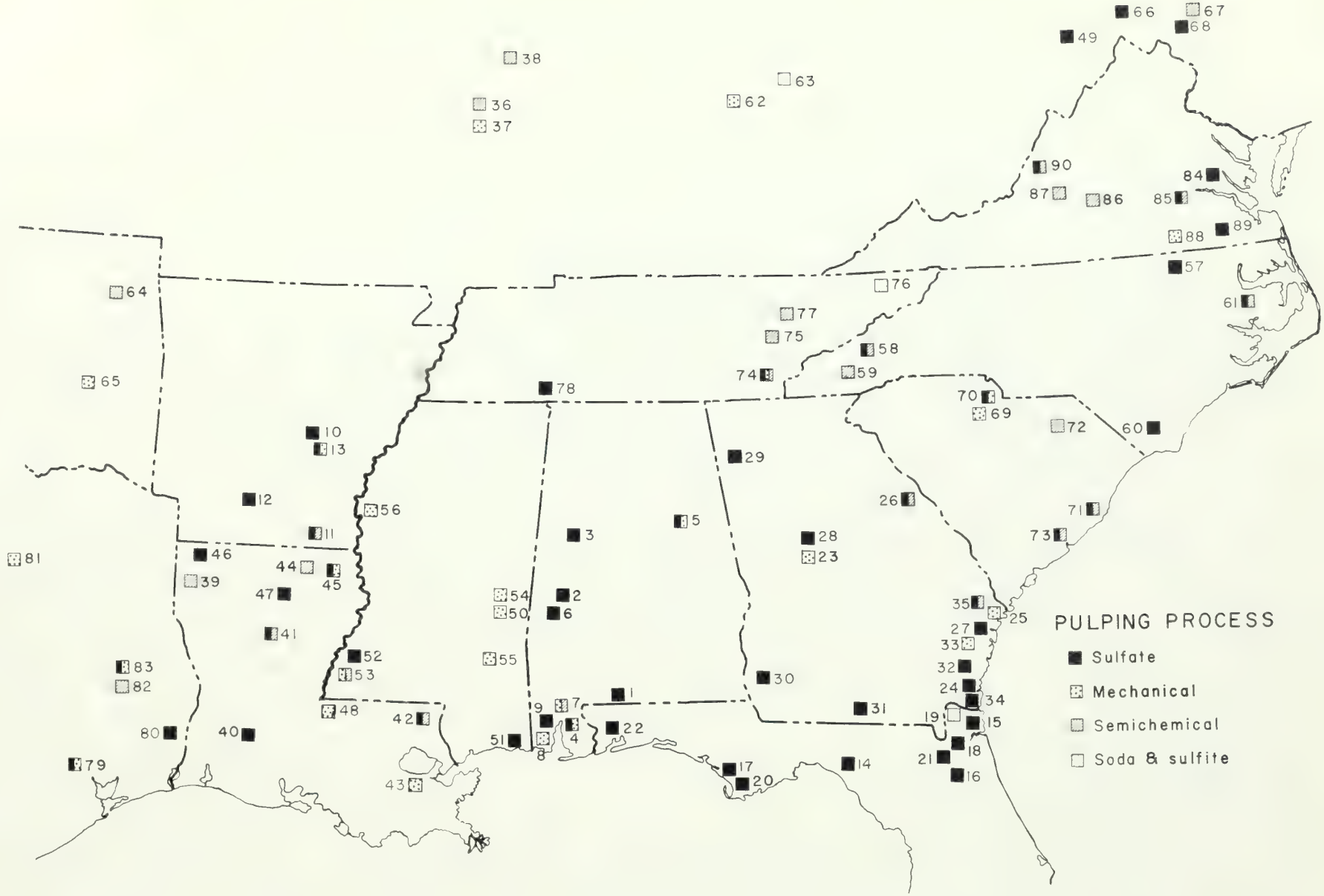


Figure 11. *Mills using southern pulpwood in 1963, by process. Numbers correspond to those in table 19.*

DETAILED TABLES

Table 3. *Round pulpwood production in the South, by State and species group, 1963 and 1962*

State	Change from 1962	1963			1962		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Percent	*Thousand cords*					
Alabama	+ 6	3,014.1	2,325.1	689.0	2,842.5	2,174.4	668.1
Arkansas	+ 5	1,372.1	1,003.1	369.0	1,310.0	974.0	336.0
Florida	+ 2	2,289.0	2,121.6	167.4	2,252.6	2,111.5	141.1
Georgia	+ 5	4,800.7	4,269.8	530.9	4,556.3	4,057.5	498.8
Louisiana	+10	1,968.5	1,503.0	465.5	1,782.8	1,375.9	406.9
Mississippi	− 7	1,706.2	683.2	1,023.0	1,831.9	858.6	973.3
North Carolina	+ 3	1,898.2	1,439.1	459.1	1,849.9	1,390.2	459.7
Oklahoma	−21	25.2	6.5	18.7	31.7	10.7	21.0
South Carolina	− 3	2,024.3	1,509.3	515.0	2,092.0	1,615.2	476.8
Tennessee	− 3	395.8	198.6	197.2	409.8	201.5	208.3
Texas	− 3	1,063.0	820.3	242.7	1,091.4	838.2	253.2
Virginia	+ 5	1,772.0	1,235.5	536.5	1,685.9	1,159.5	526.4
All states	+ 3	22,329.1	17,115.1	5,214.0	21,736.8	16,767.2	4,969.6

Table 4. *Wood residues used for pulp manufacture in the South, by State and species group, 1963 and 1962*

State	Change from 1962	1963			1962		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Percent	*Thousand cords*					
Alabama	+ 5	635.7	477.4	158.3	605.7	456.4	149.3
Arkansas	+14	478.3	461.2	17.1	419.8	407.4	12.4
Florida	+13	238.9	194.9	44.0	211.9	174.4	37.5
Georgia	+ 9	719.7	621.8	97.9	660.7	559.9	100.8
Louisiana	+21	269.7	242.6	27.1	223.4	204.5	18.9
Mississippi	+ 7	287.0	214.1	72.9	268.1	206.1	62.0
North Carolina	+11	524.7	417.5	107.2	474.0	383.3	90.7
Oklahoma	+43	39.4	39.4	.	27.6	27.6	.
South Carolina	+13	438.9	344.7	94.2	389.5	307.7	81.8
Tennessee	+37	30.9	10.6	20.3	22.5	9.8	12.7
Texas	+13	380.6	352.2	28.4	338.2	324.7	13.5
Virginia	+ 5	218.1	165.2	52.9	208.1	165.3	42.8
All states	+11	4,261.9	3,541.6	720.3	3,849.5	3,227.1	622.4

Table 5. *Wood residues used for pulp manufacture in the South, by State and type of residue, 1963*

State	All types	Chips			Other residues [1]		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Thousand cords						
Alabama	635.7	626.5	475.5	151.0	9.2	1.9	7.3
Arkansas	478.3	477.8	460.7	17.1	.5	.5	.
Florida	238.9	237.8	194.9	42.9	1.1	.	1.1
Georgia	719.7	704.1	621.3	82.8	15.6	.5	15.1
Louisiana	269.7	268.2	242.2	26.0	1.5	.4	1.1
Mississippi	287.0	276.2	212.4	63.8	10.8	1.7	9.1
North Carolina	524.7	508.1	416.5	91.6	16.6	1.0	15.6
Oklahoma	39.4	39.4	39.4	.	.	.	.
South Carolina	438.9	432.6	343.6	89.0	6.3	1.1	5.2
Tennessee	30.9	30.7	10.6	20.1	.2	.	.2
Texas	380.6	380.6	352.2	28.4	[2]	[2]	.
Virginia	218.1	213.0	165.2	47.8	5.1	.	5.1
All states	4,261.9	4,195.0	3,534.5	660.5	66.9	7.1	59.8

[1] Veneer cores, pole and piling trim, cull crossties, secondary residues.
[2] Negligible.

Table 6. *Southern pulpwood production by Experiment Station territory, 1963*

Station and source of wood	All species	Pine	Hardwood
	– – – Standard cords – – –		
Southeastern			
Roundwood	12,784,157	10,575,290	2,208,867
Residues	2,140,312	1,744,147	396,165
Total	14,924,469	12,319,437	2,605,032
Southern			
Roundwood	9,544,885	6,539,814	3,005,071
Residues	2,121,643	1,797,473	324,170
Total	11,666,528	8,337,287	3,329,241
All pulpwood	26,590,997	20,656,724	5,934,273

Table 7. *Round pulpwood production in Alabama, 1963*

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Autauga	9,379	5,565	3,814
Baldwin	226,566	164,185	62,381
Barbour	35,094	31,415	3,679
Bibb	48,122	42,371	5,751
Blount	3,527	3,476	51
Bullock	16,224	14,521	1,703
Butler	53,803	40,017	13,786
Calhoun	67,699	64,638	3,061
Chambers	20,035	19,801	234
Cherokee	36,396	22,781	13,615
Chilton	20,353	16,660	3,693
Choctaw	164,211	102,573	61,638
Clarke	118,385	74,134	44,251
Clay	40,897	34,237	6,660
Cleburne	47,064	45,587	1,477
Coffee	40,325	33,230	7,095
Colbert	11,808	11,132	676
Conecuh	70,521	39,741	30,780
Coosa	68,085	56,973	11,112
Covington	54,745	48,644	6,101
Crenshaw	25,975	18,282	7,693
Cullman	6,350	6,346	4
Dale	52,697	38,882	13,815
Dallas	19,904	13,414	6,490
De Kalb	23,086	19,786	3,300
Elmore	27,005	24,763	2,242
Escambia	74,392	51,916	22,476
Etowah	40,848	35,555	5,293
Fayette	19,488	19,262	226
Franklin	8,206	7,126	1,080
Geneva	19,232	17,478	1,754
Greene	36,182	20,329	15,853
Hale	25,436	15,781	9,655
Henry	31,106	26,975	4,131
Houston	13,838	11,301	2,537
Jackson	5,051	4,993	58
Jefferson	27,641	27,005	636
Lamar	3,117	2,862	255
Lauderdale	2,320	1,978	342
Lawrence	396	396	
Lee	30,518	26,606	3,912
Limestone	3,147	3,147	
Lowndes	33,616	24,308	9,308
Macon	8,383	8,383	
Madison	1,111	1,111	
Marengo	86,021	52,241	33,780
Marion	16,850	15,953	897
Marshall	17,463	17,013	450
Mobile	125,370	89,416	35,954
Monroe	108,421	71,824	36,597
Montgomery	61,519	50,797	10,722
Morgan	1,975	1,975	
Perry	25,501	16,848	8,653
Pickens	40,267	29,780	10,487
Pike	59,966	47,681	12,285
Randolph	61,770	55,151	6,619
Russell	46,481	46,465	16
St. Clair	62,656	58,869	3,787
Shelby	38,132	34,687	3,445
Sumter	80,995	41,008	39,987
Talladega	42,575	40,885	1,690
Tallapoosa	83,463	69,628	13,835
Tuscaloosa	63,630	60,322	3,308
Walker	49,751	49,394	357
Washington	138,944	106,016	32,928
Wilcox	96,314	55,797	40,517
Winston	13,782	13,714	68
All counties	3,014,130	2,325,130	689,000

Table 8. *Round pulpwood production in Arkansas, 1963*

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Arkansas	73		73
Ashley	162 687	118,528	44,159
Baxter	..	.	
Benton	58	58	
Boone	5	5	
Bradley	49,590	34,633	14,957
Calhoun	63,490	53,912	9,578
Carroll	..		
Chicot	26,009		26,009
Clark	59,704	42,482	17,222
Clay	...	...	.
Cleburne	8	8	
Cleveland	52,201	38,818	13,383
Columbia	98,654	81,278	17,376
Conway	664	552	112
Craighead	3	3	
Crawford	6	6	
Crittenden	5,626		5,626
Cross	...		
Dallas	49,212	38,717	10,495
Desha	2,163		2,163
Drew	96,140	47,189	48,951
Faulkner	6	6	
Franklin	5	5	
Fulton	..	..	
Garland	19,567	14,426	5,141
Grant	78,953	62,486	16,467
Greene	..	.	.
Hempstead	37,938	30,203	7,735
Hot Spring	34,788	25,011	9,777
Howard	18,433	14,583	3,850
Independence	11	9	2
Izard	4		4
Jackson	.		
Jeffesron	36,054	25,381	10,673
Johnson	2,480	2,341	139
Lafayette	29,485	22,628	6,857
Lawrence	..		
Lee	3,592		3,592
Lincoln	16,914	7,920	8,994
Little River	8,741	5,562	3,179
Logan	3,206	3,100	106
Lonoke	59	7	52
Madison	..		
Marion	..		
Miller	21,648	16,064	5,584
Mississippi	1,454		1,454
Monroe	.		
Montgomery	27,479	20,715	6,764
Nevada	39,717	32,805	6,912
Newton	17	15	2
Ouahcita	81,325	67,401	13,924
Perry	2,564	2,546	18
Phillips	6,559	3	6,556
Pike	32,957	22,886	10,071
Poinsett	.		
Polk	660	657	3
Pope	15,015	13,678	1,337
Prairie	..		
Pulaski	9,779	8,367	1,412
Randolph	..		
St. Francis	4	4	
Saline	32,249	22,740	9,509
Scott	63	63	
Searcy	.		
Sebastian	..		
Sevier	12,504	9,562	2,942
Sharp			
Stone	..		
Union	126,673	111,565	15,108
Van Buren	182	182	
Washington	.		
White	..		
Woodruff	..		
Yell	4,692	3,948	744
All counties	1,372,070	1,003,058	369,012

Table 9. *Round pulpwood production in Florida, 1963*

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Alachua	55,565	50,483	5,082
Baker	110,371	109,811	560
Bay	42,577	42,261	316
Bradford	51,182	49,720	1,462
Brevard	112	112	
Broward	. . .	. .	. .
Calhoun	37,442	36,385	1,057
Charlotte	9,064	9,064	. . .
Citrus	1,237	1,237	. . .
Clay	73,072	64,456	8,616
Collier	2,041	2,041	. . .
Columbia	102,123	97,976	4,147
Dade	2,930	2,930	
De Soto	3,307	3,307	
Dixie	74,021	65,704	8,317
Duval	74,840	69,635	5,205
Escambia	75,680	68,331	7,349
Flagler	66,287	64,460	1,827
Franklin	26,720	26,526	194
Gadsden	20,897	19,673	1,224
Gilchrist	11,080	10,080	1,000
Glades	349	349	.
Gulf	12,868	12,685	183
Hamilton	79,329	67,048	12,281
Hardee	5,872	5,872	. . .
Hendry	3,300	3,300	.
Hernando	9,727	8,860	867
Highlands	1,183	1,183	. . .
Hillsborough	5,059	5,059	.
Holmes	37,016	34,005	3,011
Indian River	. . .	.	. .
Jackson	46,513	40,146	6,367
Jefferson	34,890	27,320	7,570
Lafayette	17,961	16,450	1,511
Lake	31,103	20,498	10,605
Lee	677	677	. . .
Leon	35,904	35,599	305
Levy	39,422	38,922	500
Liberty	49,800	49,503	297
Madison	54,995	52,748	2,247
Manatee	1,196	1,196	.
Marion	126,618	116,794	9,824
Martin	443	443	.
Monroe	. . .	. . .	. . .
Nassau	154,111	136,762	17,349
Okaloosa	25,525	24,371	1,154
Okeechobee	2,549	2,549	
Orange	2,853	2,853	
Osceloa	12,007	12,007	.
Palm Beach	241	241	
Pasco	7,321	7,321	. .
Pinellas	117	117	.
Polk	20,358	20,358	
Putnam	79,763	64,136	15,627
St. Johns	95,364	89,882	5,482
St. Lucie	. . .	. . .	. . .
Santa Rosa	71,781	66,850	4,931
Sarasota	1,675	1,675	. . .
Seminole	5,987	5,987	. .
Sumter	5,234	4,434	800
Suwannee	26,115	19,527	6,588
Taylor	151,283	147,209	4,074
Union	12,390	11,659	731
Volusia	65,437	65,437	
Wakulla	32,831	32,531	300
Walton	42,548	36,567	5,981
Washington	38,797	36,306	2,491
All counties	2,289,060	2,121,628	167,432

Table 10. *Round pulpwood production in Georgia, 1963*

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Appling	89,296	85,454	3,842
Atkinson	61,941	58,232	3,709
Bacon	39,829	36,220	3,609
Baker	10,351	9,945	406
Baldwin	40,518	38,627	1,891
Banks	5,931	5,931	
Barrow	1,229	1,229	
Bartow	27,049	22,548	4,501
Ben Hill	22,149	17,753	4,396
Berrien	46,132	39,610	6,522
Bibb	10,129	8,579	1,550
Bleckley	17,777	14,020	3,757
Brantley	82,958	70,978	11,980
Brooks	19,324	16,427	2,897
Bryan	82,689	73,752	8,937
Bulloch	46,669	39,544	7,125
Burke	20,166	12,639	7,527
Butts	17,458	16,229	1,229
Calhoun	18,463	17,169	1,294
Camden	131,093	102,635	28,458
Candler	13,238	11,476	1,762
Carroll	44,210	43,137	1,073
Catoosa	3,364	3,290	74
Charlton	89,739	80,053	9,686
Chatham	26,210	16,188	10,022
Chattahoochee	15,017	14,903	114
Chattooga	16,252	14,069	2,183
Cherokee	27,727	27,123	604
Clarke	. . .	. . .	.
Clay	14,626	13,443	1,183
Clayton	4,515	4,389	126
Clinch	166,315	164,972	1,343
Cobb	17,047	16,898	149
Coffee	67,759	59,887	7,872
Colquitt	28,898	24,746	4,152
Columbia	31,678	26,820	4,858
Cook	9,332	9,089	243
Coweta	25,354	24,954	400
Crawford	25,622	23,581	2,041
Crisp	23,365	22,654	711
Dade	918	917	1
Dawson	1,555	1,550	5
Decatur	28,616	26,994	1,622
De Kalb	4,164	4,164	
Dodge	74,210	64,535	9,675
Dooly	17,220	15,616	1,604
Dougherty	52,821	51,604	1,217
Douglas	26,653	24,829	1,824
Early	20,574	20,127	447
Echols	132,348	132,348	
Effingham	54,866	48,488	6,378
Elbert	28,052	23,756	4,296
Emanuel	40,823	32,672	8,151
Evans	15,694	12,943	2,751
Fannin	4,598	3,619	979
Fayette	17,509	17,026	483
Floyd	30,269	18,541	11,728
Forsyth	3,404	3,404	
Franklin	8,609	8,609	
Fulton	13,338	13,338	
Gilmer	5,731	5,614	117
Glascock	2,675	2,299	376
Glynn	57,450	46,325	11,125
Gordon	17,641	15,918	1,723
Grady	25,909	23,118	2,791
Greene	59,573	47,602	11,971
Gwinnett	43,676	42,890	786
Habersham	11,420	11,352	68
Hall	42,740	42,740	
Hancock	24,986	21,864	3,122
Haralson	21,892	20,862	1,030
Harris	44,212	42,609	1,603
Hart	500	500	
Heard	21,173	20,943	230
Henry	19,486	19,311	175
Houston	15,301	13,717	1,584
Irwin	17,424	15,219	2,205
Jackson	17,806	17,540	266
Jasper	51,703	45,182	6,521
Jeff Davis	55,011	51,825	3,186
Jefferson	21,307	17,138	4,169
Jenkins	15,590	10,090	5,500
Johnson	14,871	11,621	3,250
Jones	46,832	43,581	3,251
Lamar	8,064	7,938	126
Lanier	22,459	22,159	300
Laurens	36,099	26,699	9,400
Lee	9,851	9,800	51
Liberty	114,129	88,040	26,089
Lincoln	19,154	15,905	3,249
Long	58,886	52,674	6,212
Lowndes	17,464	17,214	250
Lumpkin	5,076	5,076	
McDuffie	46,250	38,935	7,315
McIntosh	25,456	22,235	3,221
Macon	25,928	19,693	6,235
Madison	3,351	2,825	526
Marion	13,847	13,323	524
Meriwether	45,918	44,217	1,701
Miller	7,327	7,207	120
Mitchell	24,193	19,885	4,308
Monroe	58,801	54,549	4,252
Montgomery	19,930	16,682	3,248
Morgan	27,163	23,564	3,599
Murray	18,239	17,892	347
Muscogee	14,108	13,532	576
Newton	21,960	19,437	2,523
Oconee	4,136	3,874	262
Oglethorpe	17,140	15,173	1,967
Paulding	41,087	27,792	13,295
Peach	9,034	8,756	278
Pickens	16,676	16,210	466
Pierce	45,118	42,625	2,493
Pike	3,353	1,906	1,447
Polk	28,434	19,311	9,123
Pulaski	20,486	19,066	1,420
Putman	46,512	43,448	3,064
Quitman	10,397	10,181	216
Rabun	7,065	289	6,776
Randolph	17,657	16,743	914
Richmond	6,929	3,487	3,442
Rockdale	3,162	3,162	
Schley	7,659	6,072	1,587
Screven	28,146	21,595	6,551
Seminole	10,455	10,241	214
Spalding	7,958	7,669	289
Stephens	2,721	2,721	
Stewart	23,344	22,573	771
Sumter	13,672	13,197	475
Talbot	67,412	56,149	11,263
Taliaferro	7,555	6,755	800
Tattnall	45,066	35,968	9,098
Taylor	17,551	17,097	454

Table 10. *Round pulpwood production in Georgia, 1963* (Continued)

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Telfair	59,970	46,779	13,191
Terrell	11,555	11,400	155
Thomas	29,234	22,710	6,524
Tift	8,920	7,770	1,150
Toombs	39,455	33,237	6,218
Towns	. . .		
Treutlen	22,648	18,698	3,950
Troup	72,035	69,565	2,470
Turner	20,947	16,931	4,016
Twiggs	47,661	38,666	8,995
Union	1,685	1,492	193
Upson	52,821	48,165	4,656
Walker	17,191	16,141	1,050
Walton	3,439	3,439	
Ware	158,800	152,785	6,015
Warren	20,240	17,694	2,546
Washington	37,401	32,936	4,465
Wayne	152,323	141,939	10,384
Webster	16,142	15,375	767
Wheeler	42,173	32,879	9,294
White	2,785	2,785	
Whitfield	13,756	13,498	258
Wilcox	23,707	22,543	1,164
Wilkes	26,192	22,705	3,487
Wilkinson	76,248	66,594	9,654
Worth	18,434	17,443	991
All counties	4,800,709	4,269,843	530,866

Table 11. *Round pulpwood production in Louisiana, 1963*

Parish	All species	Pine	Hardwood
	– – – Standard cords – – –		
Acadia	2,640	2,085	555
Allen	51,641	41,335	10,306
Ascension	7		7
Assumption	.		.
Avoyelles	3,736	3,374	362
Beauregard	31,023	25,565	5,458
Bienville	107,096	91,934	15,162
Bossier	77,841	60,871	16,970
Caddo	27,688	19,115	8,573
Calcasieu	8,774	4,906	3,868
Caldwell	34,984	31,011	3,973
Cameron	. .		
Catahoula	15,863	8,828	7,035
Claiborne	78,995	73,097	5,898
Concordia	27,262		27,262
De Soto	69,923	52,836	17,087
East Baton Rouge	5,238	64	5,174
East Carroll	8,094		8,094
East Feliciana	13,231	5,530	7,701
Evangeline	9,289	5,318	3,971
Franklin	2,535	655	1,880
Grant	39,493	33,633	5,860
Iberia	. .		
Iberville	6		6
Jackson	111,768	94,401	17,367
Jefferson	. . .	.	. .
Jefferson Davis	3,422	1,685	1,737
Lafayette	.		
Lafourche	. .		
La Salle	50,125	43,574	6,551
Lincoln	79,339	67,088	12,251
Livingston	95,932	80,491	15,441
Madison	10,501		10,501
Morehouse	68,311	43,326	24,985
Natchitoches	56,924	45,451	11,473
Orleans	. . .		
Ouachita	52,281	35,890	16,391
Plaquemines	. .		
Pointe Coupee	1,328		1,328
Rapides	73,137	57,881	15,256
Red River	26,450	19,015	7,435
Richland	. . .		
Sabine	90,978	78,984	11,994
St. Bernard	. .		
St. Charles			
St. Helena	37,443	26,057	11,386
St. James	.		
St. John the Baptist	. .		
St. Landry	14,091	167	13,924
St. Martin	20,534		20,534
St. Mary	4		4
St. Tammany	29,371	26,116	3,255
Tangipahoa	35,781	25,714	10,067
Tensas	15,675		15,675
Terrebonne	.	.	. .
Union	182,808	144,731	38,077
Vermilion			
Vernon	18,994	16,823	2,171
Washington	85,372	76,561	8,811
Webster	53,697	43,267	10,430
West Baton Rouge	449		449
West Carroll	15		15
West Feliciana	7,141	590	6,551
Winn	131,291	115,021	16,270
All parishes	1,968,521	1,502,990	465,531

Table 12. *Round pulpwood production in Mississippi, 1963*

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Adams	16,225	1,619	14,606
Alcorn	8,951	6,705	2,246
Amite	24,954	5,843	19,111
Attala	20,640	1,431	19,209
Benton	3,264	1,900	1,364
Bolivar	7,375		7,375
Calhoun	2,493	1,598	895
Carroll	7,684	339	7,345
Chickasaw	10,419	9,576	843
Choctaw	13,560	3,475	10,085
Claiborne	34,853	3,342	31,511
Clarke	81,089	45,564	35,525
Clay	9,169	6,367	2,802
Coahoma	77		77
Copiah	42,156	7,543	34,613
Covington	26,767	2,116	24,651
De Soto	..		
Forrest	24,017	10,345	13,672
Franklin	38,273	15,673	22,600
George	43,473	25,573	17,900
Greene	73,464	44,871	28,593
Grenada	5,549	1,501	4,048
Hancock	55,342	37,753	17,589
Harrison	23,794	19,674	4,120
Hinds	33,598	2,576	31,022
Holmes	25,513	316	25,197
Humphreys	2,888		2,888
Issaquena	8,929		8,929
Itawamba	5,658	5,222	436
Jackson	56,105	42,628	13,477
Jasper	48,418	16,105	32,313
Jefferson	33,344	8,021	25,323
Jefferson Davis	6,654	1,676	4,978
Jones	46,616	8,901	37,715
Kemper	27,914	19,386	8,528
Lafayette	9,571	7,908	1,663
Lamar	25,393	4,481	20,912
Lauderdale	59,636	31,348	28,288
Lawrence	31,383	8,172	23,211
Leake	29,192	3,806	25,386
Lee	5,343	4,767	576
Leflore	2,424	.	2,424
Lincoln	33,177	8,923	24,254
Lowndes	4,986	3,805	1,181
Madison	13,983	1,464	12,519
Marion	50,335	19,878	30,457
Marshall	9,632	5,324	4,308
Monroe	1,597	1,575	22
Montgomery	4,806	437	4,369
Neshoba	22,345	6,634	15,711
Newton	32,223	7,754	24,469
Noxubee	12,634	8,057	4,577
Oktibbeha	6,793	3,933	2,860
Panola	2,720		2,720
Pearl River	27,190	13,138	14,052
Perry	34,505	20,766	13,739
Pike	26,780	8,833	17,947
Pontotoc	5,177	4,253	924
Prentiss	10,303	8,323	1,980
Quitman	792		792
Rankin	33,773	4,586	29,187
Scott	19,620	5,524	14,096
Sharkey	2,691		2,691
Simpson	29,618	7,267	22,351
Smith	15,145	1,043	14,102
Stone	26,702	17,092	9,610
Sunflower	. . .		
Tallahatchie	2,622	58	2,564
Tate	. . .		
Tippah	14,456	12,845	1,611
Tishomingo	29,080	22,909	6,171
Tunica	.		
Union	7,741	7,127	614
Walthall	17,939	6,258	11,681
Warren	17,530	506	17,024
Washington	13,098	12	13,086
Wayne	50,504	31,218	19,286
Webster	17,351	13,179	4,172
Wilkinson	22,034	2,554	19,480
Winston	30,607	3,787	26,820
Yalobusha	12,905	5,902	7,003
Yazoo	10,646	81	10,565
All counties	1,706,207	683,166	1,023,041

Table 13. *Round pulpwood production in North Carolina, 1963*

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Alamance	4,339	3,990	349
Alexander	5,276	5,112	164
Alleghany	102	102	
Anson	48,696	33,211	15,485
Ashe	60		60
Avery	1,194		1,194
Beaufort	74,671	58,151	16,520
Bertie	43,572	34,512	9,060
Bladen	50,308	42,649	7,659
Brunswick	86,663	79,117	7,546
Buncombe	40,316	17,178	23,138
Burke	19,999	17,231	2,768
Cabarrus	10,067	8,518	1,549
Caldwell	12,499	9,945	2,554
Camden	1,433	1,103	330
Carteret	18,856	18,585	271
Caswell	624	534	90
Catawba	2,121	1,995	126
Chatham	48,537	29,479	19,058
Cherokee	35,131	27,609	7,522
Chowan	13,356	7,931	5,425
Clay	. . .	. .	. . .
Cleveland	14,719	12,840	1,879
Columbus	65,981	46,980	19,001
Craven	34,916	30,257	4,659
Cumberland	25,407	18,300	7,107
Currituck	3,445	2,724	721
Dare	697	634	63
Davidson	4,877	4,819	58
Davie	4,316	3,791	525
Duplin	35,429	32,183	3,246
Durham	20,629	20,402	227
Edgecombe	7,832	7,391	441
Forsyth	5,338	4,669	669
Franklin	39,303	30,563	8,740
Gaston	19,950	13,729	6,221
Gates	23,988	14,740	9,248
Graham	1,091	664	427
Granville	18,232	17,550	682
Greene	2,000	2,000	.
Guilford	16,689	15,253	1,436
Halifax	32,425	25,564	6,861
Harnett	9,691	6,257	3,434
Haywood	8,795	2,574	6,221
Henderson	20,463	7,597	12,866
Hertford	27,608	13,121	14,487
Hoke	8,964	7,852	1,112
Hyde	25,053	19,987	5,066
Iredell	24,388	18,674	5,714
Jackson	45,111	1,219	43,892
Johnston	10,344	7,329	3,015
Jones	43,893	41,325	2,568
Lee	11,082	7,734	3,348
Lenoir	9,609	9,487	122
Lincoln	6,522	4,657	1,865
McDowell	21,646	13,904	7,742
Macon	12,885	801	12,084
Madison	3,084	2,074	1,010
Martin	21,422	18,283	3,139
Mecklenburg	23,334	20,000	3,334
Mitchell	1,198	7	1,191
Montgomery	9,109	8,404	705
Moore	31,473	27,865	3,608
Nash	22,572	19,472	3,100
New Hanover	7,388	7,260	128
Northampton	11,286	10,890	396
Onslow	77,050	70,525	6,525
Orange	6,759	6,108	651
Pamlico	13,876	13,204	672
Pasquotank	2,235	1,597	638
Pender	72,602	54,771	17,831
Perquimans	10,545	5,350	5,195
Person	13,116	12,788	328
Pitt	16,453	15,367	1,086
Polk	10,316	3,635	6,681
Randolph	1,556	1,516	40
Richmond	28,311	20,973	7,338
Robeson	19,020	13,210	5,810
Rockingham	12,492	12,383	109
Rowan	3,290	2,780	510
Rutherford	22,989	14,407	8,582
Sampson	42,165	34,185	7,980
Scotland	12,791	9,613	3,178
Stanly	6,647	6,229	418
Stokes	4,193	4,128	65
Surry	5,682	5,642	40
Swain	8,368	5,417	2,951
Transylvania	17,245	2,097	15,148
Tyrrell	30,659	21,998	8,661
Union	25,691	21,561	4,130
Vance	5,157	4,613	544
Wake	38,121	32,300	5,821
Warren	30,665	28,276	2,389
Washington	12,941	7,133	5,808
Watauga	70		70
Wayne	15,160	12,835	2,325
Wilkes	6,122	6,122	.
Wilson	8,800	6,033	2,767
Yadkin	3,865	3,538	327
Yancey	1,211	. .	1,211
All counties	1,898,167	1,439,112	459,055

Table 14. *Round pulpwood production in Oklahoma, 1963*

County [1]	All species	Pine	Hardwood
	– – – Standard cords – – –		
Carter	20		20
Cherokee	2,884		2,884
Delaware	2,265		2,265
Mc Curtain	17,050	6,489	10,561
Mayes	1,418		1,418
Murray	85		85
Rogers	1,418		1,418
All counties	25,140	6,489	18,651

[1] Counties with no pulpwood production are omitted.

Table 15. *Round pulpwood production in South Carolina, 1963*

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Abbeville	45,633	39,044	6,589
Aiken	63,355	46,455	16,900
Allendale	29,952	20,169	9,783
Anderson	29,810	25,484	4,326
Bamberg	19,256	10,520	8,736
Barnwell	30,664	24,904	5,760
Beaufort	21,968	9,714	12,254
Berkeley	82,345	64,564	17,781
Calhoun	8,397	6,522	1,875
Charleston	70,543	48,558	21,985
Cherokee	13,313	11,913	1,400
Chester	77,342	65,212	12,130
Chesterfield	62,238	37,559	24,679
Clarendon	29,245	19,913	9,332
Colleton	87,948	65,881	22,067
Darlington	18,419	9,808	8,611
Dillon	12,375	7,220	5,155
Dorchester	61,151	39,127	22,024
Edgefield	59,346	45,292	14,054
Fairfield	110,595	98,408	12,187
Florence	32,870	16,562	16,308
Georgetown	91,569	64,437	27,132
Greenville	20,005	17,429	2,576
Greenwood	37,353	31,995	5,358
Hampton	47,034	34,122	12,912
Horry	38,257	27,239	11,018
Jasper	59,198	48,237	10,961
Kershaw	113,220	75,776	37,444
Lancaster	58,717	43,745	14,972
Laurens	56,895	46,025	10,870
Lee	15,224	9,737	5,487
Lexington	20,194	16,679	3,515
McCormick	24,121	22,878	1,243
Marion	13,549	6,534	7,015
Marlboro	28,463	12,616	15,847
Newberry	66,891	58,462	8,429
Oconee	20,505	19,767	738
Orangeburg	26,553	16,612	9,941
Pickens	5,091	4,747	344
Richland	56,104	41,165	14,939
Saluda	31,573	25,497	6,076
Spartanburg	31,590	26,848	4,742
Sumter	30,518	21,708	8,810
Union	60,065	54,266	5,799
Williamsburg	50,259	28,617	21,642
York	54,551	41,271	13,280
All counties	2,024,264	1,509,238	515,026

Table 16. *Round pulpwood production in Tennessee, 1963*

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Anderson	6,259	3,565	2,694
Bedford	..		
Benton	2,300	746	1,554
Bledsoe	6,078	4,075	2,003
Blount	15,886	9,932	5,954
Bradley	10,705	7,367	3,338
Campbell	5,972	4,044	1,928
Cannon	..	.	..
Carroll	1,923	616	1,307
Carter	8,737	..	8,737
Cheatham	..		...
Chester	5,506	3,838	1,668
Claiborne	1,178	1,117	61
Clay	...	...	...
Cocke	8,476	6,021	2,455
Coffee	..	.	...
Crockett	.		..
Cumberland	33,869	8,006	25,863
Davidson	..	..	...
Decatur	2,304	1,862	442
De Kalb	. .	.	..
Dickson	...		
Dyer	702		702
Fayette	182	140	42
Fentress	7,049	5,088	1,961
Franklin	.	..	.
Gibson	17	17	
Giles	...		..
Grainger	2,519	1,666	853
Greene	3,147	22	3,125
Grundy	1,977	1,977	.
Hamblen	38	19	19
Hamilton	10,433	8,234	2,199
Hancock	150	..	150
Hardeman	8,270	4,688	3,582
Hardin	8,675	5,468	3,207
Hawkins	9,504	3,591	5,913
Haywood	...	.	..
Henderson	9,382	7,792	1,590
Henry	...	..	.
Hickman	.		
Houston	..	.	
Humphreys	. .		
Jackson	...	.	.
Jefferson	304	127	177
Johnson	5,195	.	5,195
Knox	7,439	3,728	3,711
Lake	.		

County	All species	Pine	Hardwood
	– – – Standard cords – – –		
Lauderdale	...	..	
Lawrence	..		
Lewis	20	20	
Lincoln	.		
Loudon	2,942	952	1,990
McMinn	29,306	22,166	7,140
McNairy	16,986	11,775	5,211
Macon	...	.	.
Madison	355	161	194
Marion	1,315	1,315	
Marshall	...	.	
Maury	...	.	
Meigs	14,497	9,291	5,206
Monroe	28,605	14,735	13,870
Montgomery	..	...	
Moore	...	.	..
Morgan	26,551	6,156	20,395
Obion	703		703
Overton	...	..	...
Perry	443	8	435
Pickett	...	.	...
Polk	26,462	17,847	8,615
Putnam	705	157	548
Rhea	14,828	5,680	9,148
Roane	4,402	1,626	2,776
Robertson	...		
Rutherford	..		
Scott	8,846	4,498	4,348
Sequatchie	2,233	1,831	402
Sevier	304	120	184
Shelby	2,427		2,427
Smith	...	.	.
Stewart	..	.	
Sullivan	9,759	22	9,737
Sumner	...		.
Tipton	2,074		2,074
Trousdale	...		
Unicoi	5,675		5,675
Union	6,091	5,063	1,028
Van Buren	...	.	
Warren	...		
Washington	4,760	1,005	3,755
Wayne	375	350	25
Weakley	...		.
White	1,003	138	865
Williamson	..		
Wilson	...		.
All counties	395,843	198,662	197,181

Table 17. *Round pulpwood production in Texas, 1963*

County [1]	All species	Pine	Hardwood
	– – – Standard cords – – –		
Anderson	5,603	4,138	1,465
Angelina	57,415	50,015	7,400
Bowie	15,139	13,713	1,426
Burleson	264	. .	264
Camp	2,516	2,516	
Cass	30,238	28,028	2,210
Chambers	3,809	1,365	2,444
Cherokee	31,736	29,867	1,869
Gregg	1,619	1,544	75
Grimes	10,485	7,919	2,566
Hardin	47,135	23,655	23,480
Harris	26,279	18,876	7,403
Harrison	27,173	24,421	2,752
Houston	31,699	25,785	5,914
Jasper	70,724	54,973	15,751
Jefferson	656	323	333
Lamar	4,102	.	4,102
Leon	2,604	109	2,495
Liberty	57,347	34,265	23,082
Marion	17,629	14,890	2,739
Montgomery	56,486	40,099	16,387
Morris	7,171	7,092	79
Nacogdoches	42,973	40,782	2,191
Newton	47,131	27,764	19,367
Orange	12,942	8,102	4,840
Panola	41,461	37,445	4,016
Polk	75,719	55,635	20,084
Robertson	212	.	212
Rusk	12,839	11,319	1,520
Sabine	46,723	41,006	5,717
San Augustine	39,377	27,982	11,395
San Jacinto	19,236	12,330	6,906
Shelby	50,537	42,090	8,447
Smith	2,759	1,832	927
Trinity	58,268	52,105	6,163
Tyler	49,883	35,156	14,727
Upshur	18,285	17,785	500
Walker	35,792	24,412	11,380
Waller	425	398	27
Wood	583	583	. .
All counties	1,062,974	820,319	242,655

[1] Counties with no pulpwood production are omitted.

Table 18. *Round pulpwood production in Virginia, 1963*

County [1]	All species	Pine	Hardwood
	– – – Standard cords – – –		
Accomack	8,888	8,885	3
Albermarle	35,940	23,043	12,897
Alleghany	50,062	7,694	42,368
Amelia	19,057	17,210	1,847
Amherst	53,816	21,338	32,478
Appomattox	48,562	20,574	27,988
Arlington	115	115	
Augusta	18,458	4,842	13,616
Bath	40,343	3,917	36,426
Bedford	46,262	29,104	17,158
Bland	1,412	1,173	239
Botetourt	24,741	7,434	17,307
Brunswick	54,935	40,208	14,727
Buchanan	. .	. .	
Buckingham	76,127	43,085	33,042
Campbell	46,666	33,771	12,895
Caroline	16,123	15,840	283
Carroll	4,044	4,044	
Charles City	17,790	12,096	5,694
Charlotte	30,261	28,319	1,942
Chesterfield	34,730	29,098	5,632
Clarke	2,737	2,737	
Craig	16,130	3,717	12,413
Culpeper	3,623	3,623	
Cumberland	25,326	22,738	2,588
Dickenson	. . .		
Dinwiddie	52,201	42,117	10,084
Elizabeth City	8	8	
Essex	24,415	22,122	2,293
Fairfax	6,233	6,059	174
Fauquier	6,035	5,999	36
Floyd	3,246	3,244	2
Fluvanna	17,109	14,550	2,559
Franklin	22,135	21,384	751
Frederick	7,503	6,712	791
Giles	452	338	114
Gloucester	23,228	19,492	3,736
Goochland	17,222	16,830	392
Grayson	. .		
Greene	3,109	3,011	98
Greensville	47,011	41,960	5,051
Halifax	16,692	16,060	632
Hanover	14,897	14,802	95
Henrico	14,198	12,118	2,080
Henry	16,057	16,055	2
Highland	11,928	1,802	10,126
Isle of Wight	13,223	7,738	5,485
James City	13,966	12,763	1,203
King and Queen	33,779	31,152	2,627
King George	3,317	3,317	
King William	24,856	21,383	3,473
Lancaster	7,998	7,967	31
Lee	709		709
Loudoun	2,399	2,378	21
Louisa	19,926	18,387	1,539
Lunenburg	17,218	13,492	3,726
Madison	3,314	3,294	20
Mathews	6,223	5,975	248
Mecklenburg	21,880	20,778	1,102
Middlesex	10,006	9,019	987
Montgomery	4,725	4,725	
Nansemond	16,374	7,749	8,625
Nelson	38,440	16,411	22,029
New Kent	34,149	29,024	5,125
Norfolk	3,020	3,014	6
Northampton	401	318	83
Northumberland	6,080	6,080	
Nottoway	16,354	15,083	1,271
Orange	9,767	8,974	793
Page	538	371	167
Patrick	4,528	4,528	
Pittsylvania	39,203	36,127	3,076
Powhatan	31,696	26,675	5,021
Prince Edward	33,225	27,748	5,477
Prince George	33,022	26,604	6,418
Prince William	20,965	18,855	2,110
Princess Anne	. . .		
Pulaski	2,255	2,255	
Rappahannock	.		
Richmond	20,740	19,634	1,106
Roanoke	3,298	2,622	676
Rockbridge	44,207	7,546	36,661
Rockingham	9,819	7,461	2,358
Russell	738		738
Scott	12,876		12,876
Shennandoah	12,784	9,322	3,462
Smyth	1,768	10	1,758
Southampton	50,821	33,583	17,238
Spotsylvania	25,102	23,527	1,575
Stafford	9,257	8,790	467
Surry	22,307	17,478	4,829
Sussex	60,115	40,977	19,138
Tazewell	. .		
Warren	2,821	2,516	305
Warwick	1,415	1,257	158
Washington	7,780		7,780
Westmoreland	9,638	9,638	
Wise	10,126	3	10,123
Wythe	4,104	2,496	1,608
York	8,858	7,157	1,701
All counties	1,771,957	1,235,469	536,488

[1] Includes independent cities.

Table 19. *Mills using southern pulpwood in 1963, by process and capacity* [1]

Location	Map code [2]	Company	Pulping capacity, 24 hours [3]				
			All processes	Sulfate	Groundwood and other mechanical	Semi-chemical	Soda and sulfite
			— — — — — — — — — Tons — — — — — — — — —				
ALABAMA							
Brewton	(1)	Container Corp. of America	300	300			
Demopolis	(2)	Gulf States Paper Corp.	400	400			
Tuscaloosa	(3)	Gulf States Paper Corp.	450	450			
Mobile	(4)	International Paper Co.	1,315	1,015	300		
Coosa Pines	(5)	Kimberly-Clark Corporation, Coosa River Newsprint Division	1,006	366	640		
Naheola	(6)	Marathon Southern Corp.	420	420			
Mobile	(7)	National Gypsum Co.	300		150	150	
Mobile	(8)	The Ruberoid Co.	48		48		
Mobile	(9)	Scott Paper Co.	900	900			
		Total	5,139	3,851	1,138	150	
ARKANSAS							
Pine Bluff	(10)	Dierks Paper Co.	150	150			
Crossett	(11)	Georgia-Pacific Corporation Crossett Division—Paper	735	625		110	
Camden	(12)	International Paper Co.	625	625			
Pine Bluff	(13)	International Paper Co.	1,145	745	400		
		Total	2,655	2,145	400	110	
FLORIDA							
Foley	(14)	The Buckeye Cellulose Corp.	910	910			
Fernandina Beach	(15)	Container Corp. of America	700	700			
Palatka	(16)	Hudson Pulp and Paper Corp.	850	850			
Panama City	(17)	International Paper Co.	1,620	1,620			
Jacksonville	(18)	Owens-Illinois, Forest Products Div.	500	500			
Fernandina Beach	(19)	Rayonier, Inc.	350				350
Port St. Joe	(20)	St. Joe Paper Co.	1,200	1,200			
Jacksonville	(21)	St. Regis Paper Co. [4]	1,370	1,370			
Pensacola	(22)	St. Regis Paper Co.	750	750			
		Total	8,250	7,900			350
GEORGIA							
Macon	(23)	Armstrong Cork Co.	400		400		
Brunswick	(24)	Brunswick Pulp and Paper Co.	1,120	1,120			
Savannah	(25)	Certain-teed Products Corp.	65		65		
Augusta	(26)	Continental Can Co., Inc.	350	225		125	
Port Wentworth	(27)	Continental Can Co., Inc.	600	600			
Macon	(28)	Georgia Kraft Co., Macon Div.	700	700			
Rome	(29)	Georgia Kraft Co., Rome Div.	1,300	1,300			
Cedar Springs	(30)	Great Southern Land and Paper Co.	700	700			
Valdosta	(31)	Owens-Illinois, Forest Products Div.	630	630			
Jesup	(32)	Rayonier, Inc.	675	675			
Savannah	(33)	The Ruberoid Co.	48		48		
St. Marys	(34)	St. Marys Kraft Corp.	950	950			
Savannah	(35)	Union Bag-Camp Paper Corp.	2,575	2,175		400	
		Total	10,113	9,075	513	525	
ILLINOIS							
Alton	(36)	Alton Box Board Co.	250			250	
East St. Louis	(37)	Certain-teed Products Corp.	85		85		
Wilmington	(38)	Lehon Co.	25			25	
		Total	360		85	275	
LOUISIANA							
Shreveport	(39)	Bird and Son, Inc.	60			60	
Elizabeth	(40)	Calcasieu Paper Co., Inc.	240	240			
Hodge	(41)	Continental Can Co., Inc.	640	500		140	
Bogalusa	(42)	Crown Zellerbach Corp.	1,275	1,140		135	
New Orleans	(43)	The Flintkote Co.	60		60		
Bastrop	(44)	International Paper Co. (Bastrop Mill)	590			590	
Bastrop	(45)	International Paper Co. (Louisiana Mill)	635	590	45		
Springhill	(46)	International Paper Co.	1,550	1,550			
West Monroe	(47)	Olin Mathieson Chemical Corp.	650	650			
St. Francisville	(48)	St. Francisville Paper Co.	235		235		
		Total	5,935	4,670	340	925	
MARYLAND							
Luke	(49)	West Virginia Pulp and Paper Co.	600	600			
		Total	600	600			

Table 19. *Mills using southern pulpwood in 1963, by process and capacity* [1] (Continued)

Location	Map code [2]	Company	Pulping capacity, 24 hours [3]				
			All processes	Sulfate	Groundwood and other mechanical	Semi-chemical	Soda and sulfite
			Tons				
MISSISSIPPI							
Meridian	(50)	The Flintkote Co.	133		133		
Moss Point	(51)	International Paper Co.	660	660			
Natchez	(52)	International Paper Co.	925	925			
Natchez	(53)	Johns-Manville Products Corp.	350		230	120	
Meridian	(54)	Kroehler Mfg. Co. of Miss., Inc. [5]	80		80		
Laurel	(55)	Masonite Corp.	1,200		1,200		
Greenville	(56)	United States Gypsum Co.	200		200		
		Total	3,548	1,585	1,843	120	
NORTH CAROLINA							
Roanoke Rapids	(57)	Albermarle Paper Manufacturing Co.	800	800			
Canton	(58)	Champion Papers, Inc.	980	930		50	
Sylva	(59)	The Mead Corp.	250			250	
Acme	(60)	Riegel Paper Corp.	875	875			
Plymouth	(61)	Weyerhaeuser Co., N. C. Div.	1,500	1,150		350	
		Total	4,405	3,755		650	
OHIO							
Cincinnati	(62)	The Philip Carey Mfg. Co.	200		200		
Chillicothe	(63)	The Mead Corp.	500				500
		Total	700		200		500
OKLAHOMA							
Pryor	(64)	Bestwall Gypsum Co.	90			90	
Craig	(65)	Dierks Forest, Inc.	50		50		
		Total	140		50	90	
PENNSYLVANIA							
Roaring Spring	(66)	D. M. Bare Paper Co.	120	120			
York	(67)	Certain-teed Products Corp.	75			75	
Spring Grove	(68)	P. H. Glatfelter Co.	215	215			
		Total	410	335		75	
SOUTH CAROLINA							
Catawba	(69)	Bowaters Board Co.	200		200		
Catawba	(70)	Bowaters Carolina Corp.	550	400	150		
Georgetown	(71)	International Paper Co.	1,990	1,455		535	
Hartsville	(72)	Sonoco Products Co.	375			375	
Charleston	(73)	West Virginia Pulp and Paper Co.	1,550	1,290		260	
		Total	4,665	3,145	350	1,170	
TENNESSEE							
Calhoun	(74)	Bowaters Southern Paper Corp.	1,425	450	800	175	
Harriman	(75)	The Mead Corp.	170			170	
Kingsport	(76)	The Mead Co.	225				225
Knoxville	(77)	Southern Extract Co.	150			150	
Counce	(78)	Tennessee River Pulp and Paper Co.	625	625			
		Total	2,595	1,075	800	495	225
TEXAS							
Pasadena	(79)	Champion Papers, Inc.	772	700	72		
Evadale	(80)	East Texas Pulp and Paper Co.	425	425			
Dallas	(81)	The Ruberoid Co.	40		40		
Diboll	(82)	Temple Industries, Inc.	130			130	
Lufkin	(83)	Southland Paper Mills, Inc.	1,250	400	850		
		Total	2,617	1,525	962	130	
VIRGINIA							
West Point	(84)	The Chesapeake Corp. of Virginia	650	650			
Hopewell	(85)	Continental Can Co., Inc.	950	800		150	
Lynchburg	(86)	The Mead Corp.	175			175	
Big Island	(87)	Owens-Illinois, Forest Products Div.	285			285	
Jarratt	(88)	Southern Johns-Manville Products Corp.	200		200		
Franklin	(89)	Union Bag-Camp Paper Corp.	600	600			
Covington	(90)	West Virginia Pulp and Paper Co.	1,300	1,050		250	
		Total	4,160	3,100	200	860	
		All states	56,292	42,761	6,881	5,575	1,075

[1] In 1963, three mills were under construction in the South. One, South Carolina Industries, Inc., at Florence, South Carolina (No. 91 in Fig. 10), with a designed daily capacity of 460 tons, began operations in January 1964. A second, Allied Paper Corporation at Jackson, Alabama (No. 92 in Fig. 10), with an initial daily capacity of 300 tons, is scheduled for completion in late 1964. The third, Crown Zellerbach Corporation at St. Francisville, Louisiana (No. 93 in Fig. 10), will have a capacity of 500 tons. All three mills will use the sulfate process.

[2] Corresponds to numbers at mill locations in figures 10 and 11.

Southern Pulp and Paper Manufacturer, vol. 26, No. 10 (Oct. 1, 1963); and other sources.

[4] Previously reported capacity was in error.

[5] Operates exclusively on secondary wood residues.

U. S. FOREST SERVICE
RESOURCE BULLETIN SE-3

SOUTHEASTERN FOREST EXPERIMENT STATION
Asheville, North Carolina

Forest Service, U. S. Department of Agriculture

1964

U. S. Forest Service Resource Bulletin SE-4 October 1966

Deer Browse Resources of the Uwharrie National Forest

by

William H. Moore and Donald D. Strode

CLEMSON UNIVERSITY LIBRARY
APR 24 1967
S. C. TECH. & AGR. DIV.

U.S. Department of Agriculture-Forest Service
Southeastern Forest Experiment Station
Asheville, North Carolina

Deer Browse Resources of the Uwharrie National Forest

by

William H. Moore and Donald D. Strode

A knowledge of the relative capacity of major forest types to support various wildlife species is of great value in deciding where and when to conduct intensive habitat and game management programs. Browse production and utilization data are useful in determining carrying capacity values and relative distribution of deer. In an effort to obtain this information on the Uwharrie National Forest, a survey was conducted using a procedure developed earlier in Georgia.[1] This procedure makes use of the continuous forest inventory as a sampling vehicle.

The National Forest in North Carolina made such an inventory of timber resources on the Uwharrie from October 1962 through May 1963. Although this survey was designed primarily to yield information on timber resources, it also provided an excellent opportunity to economically sample wildlife habitat resources. The survey determined age, volume, growth, etc. of timber species in the overstory through a plotless cruise. Ten circular plots, spaced systematically in a 1-acre area, served as sampling points for measuring regeneration, competing vegetation, etc. These same points were used to sample wildlife habitat resources. Habitat measurements involved frequency sampling for occurrence and utilization of woody understory plants, and estimates of weight of annual growth.

The 43,391-acre Uwharrie National Forest is located in Randolph, Montgomery, and Stanley Counties, and is typical of the North Carolina Piedmont. The Uwharrie Cooperative Wildlife Management Area, comprising approximately 11,000 acres of the forest, has been intensively managed since 1944. Here, wildlife resources are cooperatively managed by the Uwharrie National Forest and the North Carolina Wildlife Resources Commission.

- -

William H. Moore is Wildlife Biologist, Wildlife Habitat Research Project, Southeastern Forest Experiment Station, Asheville, N. C. Donald D. Strode is Wildlife Management Biologist, National Forests in North Carolina, Asheville, N. C.

[1] Moore, William H., Ripley, Thomas H., and Clutter, Jerome L. Trials to determine relative deer range carrying capacity values in connection with the Georgia Forest Survey. Fourteenth Ann. Conf. Southeast. Assoc. Game and Fish Commrs. Proc. 1960: 98-104.

Methods

Eleven major forest types were chosen as sampling strata:

I. Pines: Southern yellow pines compose 50 percent or more of the stand

- A. Longleaf pine--Longleaf pine predominates
- B. Loblolly pine--Loblolly pine predominates
- C. Shortleaf pine--Shortleaf pine predominates

II. Pine-hardwoods: Southern yellow pines compose 25 to 49 percent of the stand, and the remainder is hardwoods

- A. Longleaf pine-hardwood--Longleaf is the predominant southern yellow pine
- B. Loblolly pine-hardwood--Loblolly is the predominant southern yellow pine
- C. Shortleaf pine-hardwood--Shortleaf is the predominant southern yellow pine
- D. Virginia pine-hardwood--Virginia is the predominant southern yellow pine

III. Upland hardwoods: Upland hardwoods, with oaks, hickories, and sweetgum usually predominating, compose 75 percent or more of the stand

- A. Oak-hickory-gum--Major species are northern red oak, scarlet oak, chestnut oak, mockernut hickory, and sweetgum
- B. Other upland hardwoods--
  1. White oak-other hardwoods--Major species of white oak, northern red oak, and hickory
  2. Scrub oaks--Primarily scrub red oaks
  3. Post oak--Post oak and black oak

Over 43,000 acres were sampled using 176 locations (table 1). These types were further stratified by age class (even or mixed), stand size (poletimber or sawtimber), and management class (inside or outside the game management area).

Timber Management Survey crews were trained to recognize understory plant species. After a plotless cruise was completed, browse resource measurements were taken. For this purpose, 10 systematically arranged cylindrical plots, 1/500 acre in area and $4\frac{1}{2}$ feet high, were used at each location. Presence of woody plants was observed and recorded by species (up to 6). Each species was assigned one of the four browse preference rankings:

Desirables

1. Preferred--Delicacies or "candy" species. These are the first species consumed by deer. They are usually highly nutritive.

2. Staple--Foundation or "bread and butter" species. These constitute the bulk of deer diet on good range. They are high in nutritive value and provide for normal animal weight gain and reproduction.

Undesirables

3. Emergency--Life-sustaining species. These provide a large part of the diet on overstocked ranges. They are generally low in nutritive value and produce little or no animal weight gain, and animal reproduction is usually low.

4. Stuffing--Starvation species. These plants have little or no food value. Animals continually lose weight and animal reproduction is very low, if they are a major part of the diet. Some may even be toxic.

Table 1.--Forest types sampled, showing codes, number of locations sampled, and total area for each

Forest type	Identification code	Locations sampled	Total area
		Number	- - Acres - -
I. Pines		36	16,492
A. Longleaf pine	01	4	1,659
B. Loblolly pine	13	7	4,635
C. Shortleaf pine	14	25	10,198
II. Pine-hardwoods		53	8,813
A. Longleaf pine-hardwood	41	1	193
B. Loblolly pine-hardwood	43	4	88
C. Shortleaf pine-hardwood	44	44	8,334
D. Virginia pine-hardwood	45	4	198
III. Upland hardwoods		87	18,086
A. Oak-hickory-gum	51	46	11,615
B. Other upland hardwoods			
1. White oak-other hardwoods	52	35	4,665
2. Scrub oaks	53	3	900
3. Post oaks	54	3	906
Total National Forest area		176	43,391

Weight of the annual growth (browse) available to deer was estimated and the presence or absence of deer use was noted. Estimates of browse weight were expressed as pounds-per-acre dry weight. These

estimates were made with the aid of photograph standards described by Ripley and McClure.[2] Estimates were made to the nearest 10 pounds per acre.

Plot data were summarized by preference class, averaged for the location, and viewed as a single observation (cluster sample). Percent occurrence, percent utilization, and browse weight were examined for differences between major forest types, age classes (even vs. mixed), stand size (poletimber vs. sawtimber), and management classes (in management area vs. other) using analyses of variance computations.

Results and Discussion

Sample means of the three understory variables (occurrence, utilization, and weight) are presented in the appendix. A summary of these means is shown in tables 2 through 5 together with the number of locations taken and the average number of woody species encountered. Significant differences existed only when management class was considered (tables 4 and 5). Generally speaking, plots taken inside the wildlife management area were browsed heavier, contained fewer species, and had less desirable browse than plots taken outside the management area. The only significant difference between the various forest types occurred inside the management area. Pine stands had heavier use, more desirable browse, and a greater number of species than did other types within the management area. By chance, location of one of the five samples fell within a large Japanese honeysuckle patch which was heavily browsed by deer. This undoubtedly accounts for the high weight of desirable browse and heavy use. It is suspected that this small sample was not representative of pine stands. Past experience indicates that samples with less than 20 observations (locations) are weak. Nevertheless, the data reflect heavy use and higher deer populations within the wildlife management area than in the other forest areas. Browsing pressure is approximately seven times higher in the management area (20 percent vs. 3 percent), whereas desirable browse supplies are less than one-third as plentiful (7 pounds/acre vs. 24 pounds/acre). Furthermore, the species abundance of woody understory plants on the management area is about one-half that of surrounding areas (2.7 vs. 4.5 species per plot).

Table 2.--Occurrence, utilization, and weight of desirable deer browse for overstory age classes sampled

Age class (all stands)	Locations sampled	Occurrence (plots occupied)	Utilization	Browse weight	Species per plot[1]
	Number	Percent	Percent	Pounds/acre	Average number
Even	26	93	6	13	4.1
Mixed	150	95	5	21	4.1

[1] Includes all woody plants.

[2] Ripley, Thomas H., and McClure, Joe P. Deer browse resources of north Georgia. Southeast. Forest Exp. Sta., U. S. Forest Serv. Resource Bull. SE-2, 20 pp. 1963.

Table 3.--Occurrence, utilization, and weight of desirable deer browse for stand size by forest type

Forest type	Stand size	Locations sampled	Occurrence (plots occupied)	Utilization	Browse weight	Species per plot[1]
		Number	Percent	Percent	Pounds/acre	Average number
Pine stands:	Sawtimber	28	98	8	32	4.4
	Poletimber	4	100	7	20	3.9
Pine-hardwood:	Sawtimber	37	94	6	22	4.3
	Poletimber	15	89	7	29	4.1
Oak-hickory-gum:	Sawtimber	27	91	4	16	3.7
	Poletimber	17	95	3	11	4.1
All upland hardwoods:[2]	Sawtimber	51	92	4	14	3.7
	Poletimber	33	95	5	12	4.0
Total	Sawtimber	116	94	6	21	4.1
	Poletimber	52	94	5	18	4.0

[1] Includes all woody plants.
[2] Includes the oak-hickory-gum type.

Table 4.--Occurrence, utilization, and weight of desirable deer browse for game management class by forest type

Forest type	Game management class	Locations sampled	Occurrence (plots occupied)	Utilization	Browse weight	Species per plot[1]
		Number	Percent	Percent	Pounds/acre	Average number
Pine stands:	In mgt. area	5	98	55*	19	4.2
	Out of mgt. area	31	98	3	30	4.4
Pine-hardwood:	In mgt. area	10	66	19*	5	2.6
	Out of mgt. area	43	97*	4	29*	4.8*
Oak-hickory-gum:	In mgt. area	13	74	17*	4	2.3
	Out of mgt. area	33	98*	1	18	4.5*
All upland hardwoods:[2]	In mgt. area	24	80	14*	5	2.4
	Out of mgt. area	63	97*	2	16*	4.4*
Total	In mgt. area	39	80	20*	7	2.7
	Out of mgt. area	137	97*	3	24*	4.5*

[1] Includes all woody plants.
[2] Includes the oak-hickory-gum type.

Note: Means indicated by asterisk (*) are significantly higher than the other mean within the comparison at or above the 10-percent level.

Ripley and McClure (op. cit.) estimated that a total of 625 pounds of browse is required per deer to avoid exceeding the "safe" utilization rate of 40 percent of the current annual growth. If each animal consumes 2.5 pounds per day through the 100-day "pinch" period (250 pounds total), he should leave 375 pounds (60 percent) to prevent damage to the plant.

Table 5.--Occurrence, utilization, and weight of desirable deer browse for forest type by game management class

Game management class	Forest type	Locations sampled	Occurrence (plots occupied)	Utilization	Browse weight	Species per plot[1]
		Number	Percent	Percent	Pounds/acre	Average number
In mgt. area:	Pine	5	98	55*	19*	4.2*
	Pine-hardwood	10	66	19	5	2.6
	Oak-hickory-gum	13	74	17	4	2.3
	Other upland hardwoods	11	85	11	6	2.6
Out of mgt. area:	Pine	31	98	3	30	4.4
	Pine-hardwood	43	97	4	29	4.8
	Oak-hickory-gum	33	98	1	18	4.5
	Other upland hardwoods	30	96	3	15	4.3
Total	Pine	36	98	7	--	--
	Pine-hardwood	53	93	6	--	--
	Oak-hickory-gum	46	93	4	--	--
	Other upland hardwoods	41	94	5	--	--

[1] Includes all woody plants.

Note: Means indicated by asterisk (*) are significantly higher than the other mean within the comparison at or above the 10-percent level.

An average of 7 pounds of desirable browse per acre was found in the wildlife management area and 24 pounds per acre outside the management area. Therefore, it takes approximately 89 acres in the management area and 26 acres outside the management area to carry each deer (table 6); a total of approximately 125 animals for the 11,000-acre management area and 1,270 for the 33,000 acres of surrounding forest area. The availability of fruit and mast and the intensive grass and clover pasture program carried out by the North Carolina Wildlife Resources Commission undoubtedly lowers the acreage requirement within the management area to some extent. Nevertheless, the overwinter population was apparently much larger than desirable, probably exceeding the optimum by as many as 600 animals. Browse use obviously far exceeds the 40 percent optimum, and range deterioration is apparent. Differences in percent occurrence and average number of species per plot (tables 4 and 5) indicate a number of species may be completely missing in the management area, and one might surmise that this also is the result of heavy use by deer.

Table 6.--Computed carrying capacity values of the forest types sampled for National Forest lands in and out of the Wildlife Management Area

Forest type	In management area	Outside management area
	Acres per deer	
Pine stands	34	21
Pine-hardwood	125	22
Oak-hickory-gum	156	35
Other upland hardwoods	104	42
All stands	89	26

APPENDIX

Table 7.--Occurrence, utilization, and weight of deer browse resources by preference class for all ages

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	Even ages (n = 26)*	Mixed ages (n = 150)	Probability of a difference	Even ages (n = 26)	Mixed ages (n = 150)	Probability of a difference	Even ages (n = 26)	Mixed ages (n = 150)	Probability of a difference
	- - - - Percent - - - -			- - - - Percent - - - -			Pounds per acre		Percent
1	16	12	n.s.	17	15	n.s.			
2	93	92	n.s.	3	3	n.s.			
Desirable	93	95	n.s.	6	5	n.s.	13	21	n.s.
3	85	86	n.s.	Tr.	Tr.	--			
4	44	49	n.s.	Tr.	Tr.	--			
Undesirable	94	95	n.s.	Tr.	Tr.	--	13	26	--
Total	100	100	n.s.	3	3	n.s.	26	47	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 8.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	Saw-timber (n = 116)*	Pole-timber (n = 52)	Probability of a difference	Saw-timber (n = 116)	Pole-timber (n = 52)	Probability of a difference	Saw-timber (n = 116)	Pole-timber (n = 52)	Probability of a difference
	- - - - Percent - - - -			- - - - Percent - - - -			Pounds per acre		Percent
1	13	12	n.s.	16	17	n.s.			
2	93	91	n.s.	3	2	n.s.			
Desirable	94	94	n.s.	6	5	n.s.	21	18	n.s.
3	84	87	n.s.	Tr.	Tr.	--			
4	48	45	n.s.	Tr.	Tr.	--			
Undesirable	94	95	n.s.	Tr.	Tr.	n.s.	25	20	--
Total	100	100	n.s.	3	3	n.s.	46	38	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 9.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on pine sites

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	Sawtimber (n = 28)*	Poletimber (n = 4)	Probability of a difference	Sawtimber (n = 28)	Poletimber (n = 4)	Probability of a difference	Sawtimber (n = 28)	Poletimber (n = 4)	Probability of a difference
	Percent			Percent			Pounds per acre		Percent
1	22	49	n.s.	28	47	n.s.			
2	96	97	n.s.	4	Tr.	n.s.			
Desirable	98	100	n.s.	8	7	n.s.	32	20	n.s.
3	83	73	n.s.	Tr.	0	--			
4	56	36	n.s.	Tr.	0	--			
Undesirable	94	83	n.s.	Tr.	0	--	30	10	--
Total	100	100	n.s.	5	5	n.s.	62	30	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 10.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on pine-hardwood sites

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	Sawtimber (n = 37)*	Poletimber (n = 15)	Probability of a difference	Sawtimber (n = 37)	Poletimber (n = 15)	Probability of a difference	Sawtimber (n = 37)	Poletimber (n = 15)	Probability of a difference
	Percent			Percent			Pounds per acre		Percent
1	13	13	n.s.	15	14	n.s.			
2	93	85	n.s.	4	2	n.s.			
Desirable	94	89	n.s.	6	7	n.s.	22	29	n.s.
3	88	93	n.s.	1	Tr.	n.s.			
4	48	46	n.s.	Tr.	Tr.	--			
Undesirable	97	98	n.s.	Tr.	Tr.	--	20	39	--
Total	100	100	n.s.	4	3	n.s.	42	68	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 11.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on oak-hickory-gum sites

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	Saw-timber (n = 27)*	Pole-timber (n = 17)	Probability of a difference	Saw-timber (n = 27)	Pole-timber (n = 17)	Probability of a difference	Saw-timber (n = 27)	Pole-timber (n = 17)	Probability of a difference
	- - - - Percent - - - -			- - - - Percent - - - -			Pounds per acre		Percent
1	8	8	n.s.	7	13	n.s.			
2	89	93	n.s.	2	2	n.s.			
Desirable	91	95	n.s.	4	3	n.s.	16	11	n.s.
3	85	83	n.s.	Tr.	Tr.	--			
4	43	52	n.s.	0	0	--			
Undesirable	93	92	n.s.	Tr.	Tr.	--	37	10	--
Total	99	99	n.s.	2	2	n.s.	53	21	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 12.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on all hardwood sites

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	Saw-timber (n = 51)*	Pole-timber (n = 33)	Probability of a difference	Saw-timber (n = 51)	Pole-timber (n = 33)	Probability of a difference	Saw-timber (n = 51)	Pole-timber (n = 33)	Probability of a difference
	- - - - Percent - - - -			- - - - Percent - - - -			Pounds per acre		Percent
1	9	8	n.s.	10	16	n.s.			
2	90	93	n.s.	2	2	n.s.			
Desirable	92	95	n.s.	4	5	n.s.	14	12	n.s.
3	82	86	n.s.	Tr.	Tr.	--			
4	43	46	n.s.	Tr.	Tr.	--			
Undesirable	91	94	n.s.	Tr.	Tr.	--	27	14	--
Total	99	100	n.s.	2	3	n.s.	41	26	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 13.--Frequency distribution, utilization, and weight of deer browse resources by preference class for management class

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	In mgt. area (n = 39)*	Out of mgt. area (n = 137)	Probability of a difference	In mgt. area (n = 39)	Out of mgt. area (n = 137)	Probability of a difference	In mgt. area (n = 39)	Out of mgt. area (n = 137)	Probability of a difference
	Percent			Percent			Pounds per acre		Percent
1	12	12	n.s.	34	11	97.5			
2	75	96	99.5	13	1	99.5			
Desirable	80	97	99.5	20	3	99.5	7	24	99.5
3	71	89	99.5	2	Tr.	99.5			
4	30	53	99.5	Tr.	Tr.	--			
Undesirable	86	96	99.5	1	Tr.	99.5	13	27	--
Total	99	100	99.5	11	2	99.5	20	51	97.5

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 14.--Frequency distribution, utilization, and weight of deer browse resources by preference class for management class on pine sites

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	In mgt. area (n = 5)*	Out of mgt. area (n = 31)	Probability of a difference	In mgt. area (n = 5)	Out of mgt. area (n = 31)	Probability of a difference	In mgt. area (n = 5)	Out of mgt. area (n = 31)	Probability of a difference
	Percent			Percent			Pounds per acre		Percent
1	59	19	97.5	94	14	99.5			
2	92	97	n.s.	41	1	99.5			
Desirable	98	98	n.s.	55	3	99.5	19	30	n.s.
3	77	84	n.s.	3	Tr.	99.0			
4	56	55	n.s.	0	Tr.	--			
Undesirable	95	94	n.s.	2	Tr.	95.0	33	26	--
Total	100	100	n.s.	35	2	99.5	52	56	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 15.--Frequency distribution, utilization, and weight of deer browse resources by preference class for management class on pine-hardwood sites

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	In mgt. area (n = 10)*	Out of mgt. area (n = 43)	Probability of a difference	In mgt. area (n = 10)	Out of mgt. area (n = 43)	Probability of a difference	In mgt. area (n = 10)	Out of mgt. area (n = 43)	Probability of a difference
	- - - - Percent - - - -			- - - - Percent - - -			Pounds per acre		Percent
1	15	12	n.s.	38	10	n.s.			
2	61	95	99.5	13	2	99.5			
Desirable	66	97	99.5	19	4	99.5	5	29	90.0
3	77	92	97.5	2	Tr.	99.0			
4	30	53	95.0	0	Tr.	--			
Undesirable	91	98	99.0	1	Tr.	90.0	17	29	--
Total	99	100	99.5	11	2	99.5	22	58	90.0

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 16.--Frequency distribution, utilization, and weight of deer browse resources by preference class for management class on oak-hickory-gum sites

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	In mgt. area (n = 13)*	Out of mgt. area (n = 33)	Probability of a difference	In mgt. area (n = 13)	Out of mgt. area (n = 33)	Probability of a difference	In mgt. area (n = 13)	Out of mgt. area (n = 33)	Probability of a difference
	- - - - Percent - - - -			- - - - Percent - - - -			Pounds per acre		Percent
1	4	9	n.s.	31	5	90.0			
2	70	97	99.5	10	Tr.	99.5			
Desirable	74	98	99.5	17	1	99.5	4	18	n.s.
3	69	91	99.5	1	0	--			
4	21	58	99.5	0	0	--			
Undesirable	79	97	99.5	1	0	--	8	33	--
Total	98	100	n.s.	8	1	99.5	12	51	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 17.--Frequency distribution, utilization, and weight of deer browse resources by preference class for management class on all hardwood sites

Browse preference classes	Distribution of plots occupied			Distribution of browse classes utilized			Browse weight		
	In mgt. area (n = 24)*	Out of mgt. area (n = 63)	Probability of a difference	In mgt. area (n = 24)	Out of mgt. area (n = 63)	Probability of a difference	In mgt. area (n = 24)	Out of mgt. area (n = 63)	Probability of a difference
	Percent			Percent			Pounds per acre		Percent
1	5	9	n.s.	20	10	n.s.			
2	76	96	99.5	8	1	99.5			
Desirable	80	97	99.5	14	2	99.5	5	16	97.5
3	67	89	99.5	1	Tr.	99.5			
4	26	52	99.5	Tr.	Tr.	--			
Undesirable	81	96	99.5	1	Tr.	99.5	7	27	--
Total	99	100	n.s.	7	1	99.5	12	43	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 18.--Frequency distribution and utilization of deer browse resources by preference class for forest type

Browse preference classes	Distribution of plots occupied					Distribution of browse classes utilized				
	Pine (n = 36)*	Pine-hardwood (n = 53)	Oak-hickory-gum (n = 46)	Other hardwoods (n = 41)	Probability of a difference	Pine (n = 36)	Pine-hardwood (n = 53)	Oak-hickory-gum (n = 46)	Other hardwoods (n = 41)	Probability of a difference
	Percent					Percent				
1	24	13	8	9	97.5	24	14	10	16	n.s.
2	96	91	91	92	n.s.	3	3	2	2	n.s.
Desirable	98	93	93	94	n.s.	7	6	4	5	n.s.
3	83	90	86	82	n.s.	Tr.	Tr.	Tr.	Tr.	n.s.
4	55	49	47	42	n.s.	Tr.	Tr.	0	Tr.	n.s.
Undesirable	94	97	93	92	n.s.	Tr.	Tr.	Tr.	Tr.	--
Total	100	100	99	100	n.s.	4	3	2	3	n.s.

* Number of locations.
Tr. = Trace (less than .05 percent).
See text for browse class explanation.

Table 19.--Frequency distribution, utilization, and weight of deer browse resources by preference class for forest type in the management area

Browse preference classes	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Pine (n = 5)*	Pine-hardwood (n = 10)	Oak-hickory-gum (n = 13)	Other hardwoods (n = 11)	Probability of a difference	Pine (n = 5)	Pine-hardwood (n = 10)	Oak-hickory-gum (n = 13)	Other hardwoods (n = 11)	Probability of a difference	Pine (n = 5)	Pine-hardwood (n = 10)	Oak-hickory-gum (n = 13)	Other hardwoods (n = 11)	Probability of a difference
	Percent					Percent					Pounds per acre				Percent
1	59	15	4	7	99.5	94	38	31	10	90.0					
2	92	61	70	82	n.s.	41	13	10	6	n.s.					
Desirable	98	66	74	85	n.s.	55	19	17	11	90.0	19	5	4	6	99.0
3	77	77	69	65	n.s.	3	2	1	2	n.s.					
4	56	30	21	32	n.s.	0	0	0	Tr.	--					
Undesirable	95	91	79	83	n.s.	2	1	1	2	n.s.	35	17	8	7	--
Total	100	99	98	100	n.s.	35	11	8	6	97.5	54	22	12	13	97.5

*Number of locations. Tr. = Trace (less than .05 percent). See text for browse class explanation.

Table 20.--Frequency distribution, utilization, and weight of deer browse resources by preference class for forest type out of the management area

Browse preference classes	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Pine (n = 31)*	Pine-hardwood (n = 43)	Oak-hickory-gum (n = 33)	Other hardwoods (n = 30)	Probability of a difference	Pine (n = 31)	Pine-hardwood (n = 43)	Oak-hickory-gum (n = 33)	Other hardwoods (n = 30)	Probability of a difference	Pine (n = 31)	Pine-hardwood (n = 43)	Oak-hickory-gum (n = 33)	Other hardwoods (n = 30)	Probability of a difference
	Percent					Percent					Pounds per acre				Percent
1	19	12	9	10	n.s.	14	10	5	18	n.s.					
2	97	95	97	95	n.s.	1	2	Tr.	1	n.s.					
Desirable	98	97	98	96	n.s.	3	4	1	3	n.s.	30	29	18	15	n.s.
3	84	92	91	87	n.s.	Tr.	Tr.	0	Tr.	--					
4	55	53	58	46	n.s.	Tr.	Tr.	0	Tr.	--					
Undesirable	94	98	97	95	90.0	Tr.	Tr.	0	Tr.	--	26	29	33	19	--
Total	100	100	100	100	n.s.	2	2	1	2	n.s.	56	58	51	34	n.s.

*Number of locations. Tr. = Trace (less than .05 percent). See text for browse class explanation.

Table 21.--Species dominant on one or more plots, by forest type and management class

PINE STANDS

Browse species		Game management class					
		In management area (n = 5)		Out of management area (n = 31)		Total area (n = 36)	
		Plots occupied	Occupied plots used	Plots occupied	Occupied plots used	Plots occupied	Occupied plots used
		Percent					
Desirable: Preferred							
Japanese honeysuckle	Lonicera japonica Thunb.	18.0	88.9	5.5	35.3	7.2	53.8
Greenbrier	Smilax spp.	4.0	50.0	1.0	33.3	1.4	40.0
Desirable: Staple							
Azalea	Rhododendron spp.	0.0	--	0.6	50.0	0.6	50.0
Blackgum	Nyssa sylvatica Marsh.	0.0	--	13.6	2.4	11.7	2.4
Flowering dogwood	Cornus florida L.	14.0	42.9	10.0	9.7	10.6	15.8
Fringetree	Chionanthus virginicus L.	0.0	--	0.3	0.0	0.3	0.0
Grape	Vitis spp.	2.0	0.0	1.0	0.0	1.1	0.0
Hard maple	Acer saccharum Marsh.	0.0	--	0.0	--	0.0	--
Soft maple	A. rubrum L., A. negundo L.	4.0	100.0	10.6	0.0	9.7	5.7
Serviceberry	Amelanchier spp.	0.0	--	0.0	--	0.0	--
Sourwood	Oxydendrum arboreum (L.) DC.	4.0	100.0	7.7	8.3	7.2	15.4
Sweet-shrub	Calycanthus floridus L.	0.0	--	0.0	--	0.0	--
Viburnum	Viburnum spp.	0.0	--	0.3	0.0	0.3	0.0
White ash	Fraxinus americana L.	0.0	--	0.0	--	0.0	--
Other ash	Fraxinus spp.	0.0	--	0.0	--	0.0	--
Witch-hazel	Hamamelis virginiana L.	0.0	--	0.0	--	0.0	--
Yellow jessamine	Gelsemium sempervirens (L.) Ait. f.	0.0	--	0.0	--	0.0	--
Yellow-poplar	Liriodendron tulipifera L.	2.0	0.0	0.0	--	0.3	0.0
Undesirable: Emergency							
Black oak	Quercus velutina Lam.	0.0	--	0.6	0.0	0.6	0.0
Chestnut oak	Q. prinus L.	0.0	--	1.0	0.0	0.8	0.0
Post oak	Q. stellata Wangenh.	0.0	--	0.6	0.0	0.6	0.0
Scarlet oak	Q. coccinea Muenchh.	0.0	--	1.0	0.0	0.8	0.0
Scrub red oaks	Quercus spp.	0.0	--	1.3	0.0	1.1	0.0
Southern red oak	Q. falcata Michx.	0.0	--	0.3	0.0	0.3	0.0
Water & willow oak	Q. nigra L. & Q. phellos L.	0.0	--	0.0	--	0.0	--
White oak	Q. alba L.	0.0	--	1.0	0.0	0.8	0.0
Black cherry	Prunus serotina Ehrh.	0.0	--	0.0	--	0.0	--
Other cherries	Prunus spp.	0.0	--	0.0	--	0.0	--
Blueberries	Vaccinium spp.	0.0	--	4.8	0.0	4.2	0.0
Common sweetleaf	Symplocos tinctoria (L.) L'Her.	0.0	--	0.0	--	0.0	--
Common persimmon	Diospyros virginiana L.	0.0	--	0.3	0.0	0.3	0.0
Cucumbertree	Magnolia acuminata L.	0.0	--	0.0	--	0.0	--
Other magnolias	Magnolia spp.	0.0	--	0.0	--	0.0	--
Eastern redcedar	Juniperus virginiana L.	0.0	--	4.5	0.0	3.9	0.0
Eastern redbud	Cercis canadensis L.	0.0	--	0.0	--	0.0	--
Mountain-laurel	Kalmia latifolia L.	0.0	--	1.3	0.0	1.1	0.0
Sweetgum	Liquidambar styraciflua L.	10.0	0.0	4.8	0.0	5.6	0.0
Undesirable: Stuffing							
Alder	Alnus spp.	0.0	--	0.0	--	0.0	--
American beech	Fagus grandifolia Ehrh.	2.0	0.0	0.0	--	0.3	0.0
American holly	Ilex opaca Ait.	38.0	0.0	8.4	0.0	12.5	0.0
American hornbeam (Bluebeech)	Carpinus caroliniana Walt.	0.0	--	1.0	0.0	0.8	0.0
Buckeye	Aesculus spp.	0.0	--	0.0	--	0.0	--
Eastern hophornbeam	Ostrya virginiana (Mill.) K. Koch	0.0	--	0.0	--	0.0	--
Elm	Ulmus spp.	0.0	--	0.0	--	0.0	--
Hackberry	Celtis spp.	0.0	--	0.0	--	0.0	--
Hawthorn	Crataegus spp.	0.0	--	0.3	0.0	0.3	0.0
Hickory	Carya spp.	0.0	--	1.3	25.0	1.1	25.0
Loblolly pine	Pinus taeda L.	0.0	--	5.2	0.0	4.4	0.0
Longleaf pine	P. palustris Mill.	0.0	--	1.0	6.2	0.8	1.9
Shortleaf pine	P. echinata Mill.	2.0	0.0	5.2	0.0	4.7	0.0
Virginia pine	P. virginiana Mill.	0.0	--	0.3	0.0	0.3	0.0
Virginia creeper	Parthenocissus quinquefolia (L.) Planch.	0.0	--	0.0	--	0.0	--

Table 21.--Species dominant on one or more plots, by forest type and management class (continued)

PINE-HARDWOOD

Browse species		Game management class					
		In management area (n = 10)		Out of management area (n = 43)		Total area (n = 53)	
		Plots occupied	Occupied plots used	Plots occupied	Occupied plots used	Plots occupied	Occupied plots used
		Percent					
Desirable: Preferred							
Japanese honeysuckle	Lonicera japonica Thunb.	0.0	--	4.2	55.6	3.4	55.6
Greenbrier	Smilax spp.	3.0	66.7	2.6	36.4	2.6	42.9
Desirable: Staple							
Azalea	Rhododendron spp.	1.0	0.0	1.6	0.0	1.5	0.0
Blackgum	Nyssa sylvatica Marsh.	1.0	0.0	13.7	8.8	11.3	8.3
Flowering dogwood	Cornus florida L.	7.0	0.0	9.5	0.0	9.1	0.0
Fringetree	Chionanthus virginicus L.	0.0	--	0.0	--	0.0	--
Grape	Vitis spp.	2.0	0.0	0.2	0.0	0.6	0.0
Hard maple	Acer saccharum Marsh.	8.0	0.0	0.0	--	1.5	0.0
Soft maple	A. rubrum L., A. negundo L.	5.0	20.0	9.1	0.0	8.3	2.3
Serviceberry	Amelanchier spp.	0.0	--	0.0	--	0.0	--
Sourwood	Oxydendrum arboreum (L.) DC.	3.0	33.3	14.0	0.0	11.9	1.6
Sweet-shrub	Calycanthus floridus L.	0.0	--	0.0	--	0.0	--
Viburnum	Viburnum spp.	1.0	0.0	1.4	16.7	1.3	14.3
White ash	Fraxinus americana L.	0.0	--	0.2	0.0	0.2	0.0
Other ash	Fraxinus spp.	0.0	--	0.0	--	0.0	--
Witch-hazel	Hamamelis virginiana L.	0.0	--	0.2	0.0	0.2	0.0
Yellow jessamine	Gelsemium sempervirens (L.) Ait. f.	0.0	--	0.2	0.0	0.2	0.0
Yellow-poplar	Liriodendron tulipifera L.	0.0	--	0.5	50.0	0.4	50.0
Undesirable: Emergency							
Black oak	Quercus velutina Lam.	0.0	--	0.0	--	0.0	--
Chestnut oak	Q. prinus L.	3.0	0.0	3.7	0.0	3.6	0.0
Post oak	Q. stellata Wangenh.	0.0	--	1.6	0.0	1.3	0.0
Scarlet oak	Q. coccinea Muenchh.	0.0	--	1.2	0.0	0.9	0.0
Scrub red oaks	Quercus spp.	2.0	0.0	2.1	0.0	1.7	0.0
Southern red oak	Q. falcata Michx.	0.0	--	0.7	0.0	0.6	0.0
Water & willow oak	Q. nigra L. & Q. phellos L.	0.0	--	0.2	0.0	0.2	0.0
White oak	Q. alba L.	3.0	0.0	1.8	0.0	1.5	0.0
Black cherry	Prunus serotina Ehrh.	0.0	--	0.2	0.0	0.2	0.0
Other cherries	Prunus spp.	0.0	--	0.7	66.7	0.6	66.7
Blueberries	Vaccinium spp.	16.0	12.5	5.3	0.0	4.3	8.7
Common sweetleaf	Symplocos tinctoria (L.) L'Her.	3.0	0.0	0.7	0.0	0.6	0.0
Common persimmon	Diospyros virginiana L.	5.0	20.0	1.6	0.0	1.3	14.3
Cucumbertree	Magnolia acuminata L.	0.0	--	0.0	--	0.0	--
Other magnolias	Magnolia spp.	0.0	--	0.0	--	0.0	--
Eastern redcedar	Juniperus virginiana L.	2.0	0.0	2.1	0.0	1.7	0.0
Eastern redbud	Cercis canadensis L.	0.0	--	0.0	--	0.0	--
Mountain-laurel	Kalmia latifolia L.	9.0	0.0	8.1	0.0	6.6	0.0
Sweetgum	Liquidambar styraciflua L.	0.0	--	2.8	0.0	2.3	0.0
Undesirable: Stuffing							
Alder	Alnus spp.	2.0	0.0	0.2	0.0	0.6	0.0
American beech	Fagus grandifolia Ehrh.	0.0	--	0.2	0.0	0.2	0.0
American holly	Ilex opaca Ait.	4.0	0.0	5.1	0.0	4.9	0.0
American hornbeam (Bluebeech)	Carpinus caroliniana Walt.	0.0	--	0.5	50.0	0.4	50.0
Buckeye	Aesculus spp.	0.0	--	0.0	--	0.0	--
Eastern hophornbeam	Ostrya virginiana (Mill.) K. Koch	0.0	--	0.2	0.0	0.2	0.0
Elm	Ulmus spp.	0.0	--	0.0	--	0.0	--
Hackberry	Celtis spp.	0.0	--	0.0	--	0.0	--
Hawthorn	Crataegus spp.	0.0	--	0.0	--	0.0	--
Hickory	Carya spp.	2.0	0.0	1.9	0.0	1.9	0.0
Loblolly pine	Pinus taeda L.	0.0	--	4.7	0.0	3.8	0.0
Longleaf pine	P. palustris Mill.	0.0	--	0.0	--	0.0	--
Shortleaf pine	P. echinata Mill.	5.0	0.0	5.6	0.0	5.5	0.0
Virginia pine	P. virginiana Mill.	2.0	0.0	0.5	0.0	0.8	0.0
Virginia creeper	Parthenocissus quinquefolia (L.) Planch.	0.0	--	0.2	0.0	0.1	0.0

Table 21.--Species dominant on one or more plots, by forest type and management class (continued)

OAK-HICKORY-GUM

Browse species		Game management class					
		In management area (n = 13)		Out of management area (n = 33)		Total area (n = 46)	
		Plots occupied	Occupied plots used	Plots occupied	Occupied plots used	Plots occupied	Occupied plots used
		Percent					
Desirable: Preferred							
Japanese honeysuckle	Lonicera japonica Thunb.	0.0	--	0.3	0.0	0.2	0.0
Greenbrier	Smilax spp.	1.5	100.0	2.4	50.0	2.1	60.0
Desirable: Staple							
Azalea	Rhododendron spp.	3.8	40.0	0.6	0.0	1.5	28.6
Blackgum	Nyssa sylvatica Marsh.	2.3	33.3	16.1	5.7	12.2	7.1
Flowering dogwood	Cornus florida L.	20.0	15.4	11.8	0.0	14.1	6.2
Fringetree	Chionanthus virginicus L.	0.0	--	0.0	--	0.0	--
Grape	Vitis spp.	6.2	0.0	1.5	0.0	2.8	0.0
Hard maple	Acer saccharum Marsh.	0.0	--	0.0	--	0.0	--
Soft maple	A. rubrum L., A. negundo L.	9.2	0.0	10.3	0.0	10.0	0.0
Serviceberry	Amelanchier spp.	0.0	--	0.3	0.0	0.2	0.0
Sourwood	Oxydendrum arboreum (L.) DC.	10.8	35.7	8.2	0.0	8.9	12.2
Sweet-shrub	Calycanthus floridus L.	0.0	--	0.3	0.0	0.2	0.0
Viburnum	Viburnum spp.	1.5	0.0	0.3	0.0	0.7	0.0
White ash	Fraxinus americana L.	0.0	--	0.0	--	0.0	--
Other ash	Fraxinus spp.	0.0	--	0.0	--	0.0	--
Witch-hazel	Hamamelis virginiana L.	0.0	--	0.0	--	0.0	--
Yellow jessamine	Gelsemium sempervirens (L.) Ait. f.	0.0	--	0.6	0.0	0.4	0.0
Yellow-poplar	Liriodendron tulipifera L.	0.0	--	0.0	--	0.0	--
Undesirable: Emergency							
Black oak	Quercus velutina Lam.	0.0	--	0.3	0.0	0.2	0.0
Chestnut oak	Q. prinus L.	11.5	0.0	3.3	0.0	5.7	0.0
Post oak	Q. stellata Wangenh.	0.8	0.0	0.3	0.0	0.4	0.0
Scarlet oak	Q. coccinea Muenchh.	0.0	--	1.8	0.0	1.3	0.0
Scrub red oaks	Quercus spp.	0.8	0.0	1.8	0.0	1.5	0.0
Southern red oak	Q. falcata Michx.	0.0	--	0.0	--	0.0	--
Water & willow oak	Q. nigra L. & Q. phellos L.	0.0	--	0.0	--	0.0	--
White oak	Q. alba L.	1.5	0.0	2.4	0.0	2.2	0.0
Black cherry	Prunus serotina Ehrh.	0.0	--	0.0	--	0.0	--
Other cherries	Prunus spp.	0.0	--	0.0	--	0.0	--
Blueberries	Vaccinium spp.	8.5	9.1	5.5	0.0	6.3	3.4
Common sweetleaf	Symplocos tinctoria (L.) L'Her.	1.5	0.0	0.0	--	0.4	0.0
Common persimmon	Diospyros virginiana L.	1.5	0.0	0.3	0.0	0.7	0.0
Cucumbertree	Magnolia acuminata L.	0.0	--	0.0	--	0.0	--
Other magnolias	Magnolia spp.	0.0	--	0.3	0.0	0.2	0.0
Eastern redcedar	Juniperus virginiana L.	0.8	0.0	0.6	0.0	0.7	0.0
Eastern redbud	Cercis canadensis L.	0.0	--	0.6	0.0	0.4	0.0
Mountain-laurel	Kalmia latifolia L.	0.8	0.0	3.9	0.0	3.0	0.0
Sweetgum	Liquidambar styraciflua L.	0.0	--	3.9	0.0	2.8	0.0
Undesirable: Stuffing							
Alder	Alnus spp.	0.0	--	1.2	0.0	0.9	0.0
American beech	Fagus grandifolia Ehrh.	0.0	--	0.3	0.0	0.2	0.0
American holly	Ilex opaca Ait.	6.2	0.0	7.9	0.0	7.4	0.0
American hornbeam (Bluebeech)	Carpinus caroliniana Walt.	0.0	--	0.0	--	0.0	--
Buckeye	Aesculus spp.	0.0	--	0.0	--	0.0	--
Eastern hophornbeam	Ostrya virginiana (Mill.) K. Koch	0.0	--	0.0	--	0.0	--
Elm	Ulmus spp.	0.0	--	0.0	--	0.0	--
Hackberry	Celtis spp.	0.0	--	0.0	--	0.0	--
Hawthorn	Crataegus spp.	0.0	--	0.6	0.0	0.4	0.0
Hickory	Carya spp.	1.5	0.0	3.6	0.0	3.0	0.0
Loblolly pine	Pinus taeda L.	0.0	--	3.9	0.0	2.8	0.0
Longleaf pine	P. palustris Mill.	0.0	--	0.6	0.0	0.4	0.0
Shortleaf pine	P. echinata Mill.	1.5	0.0	0.9	0.0	1.1	0.0
Virginia pine	P. virginiana Mill.	0.8	0.0	1.2	0.0	1.1	0.0
Virginia creeper	Parthenocissus quinquefolia (L.) Planch.	0.0	--	0.0	--	0.0	--

Table 21.--Species dominant on one or more plots, by forest type and management class (continued)

OTHER UPLAND HARDWOODS

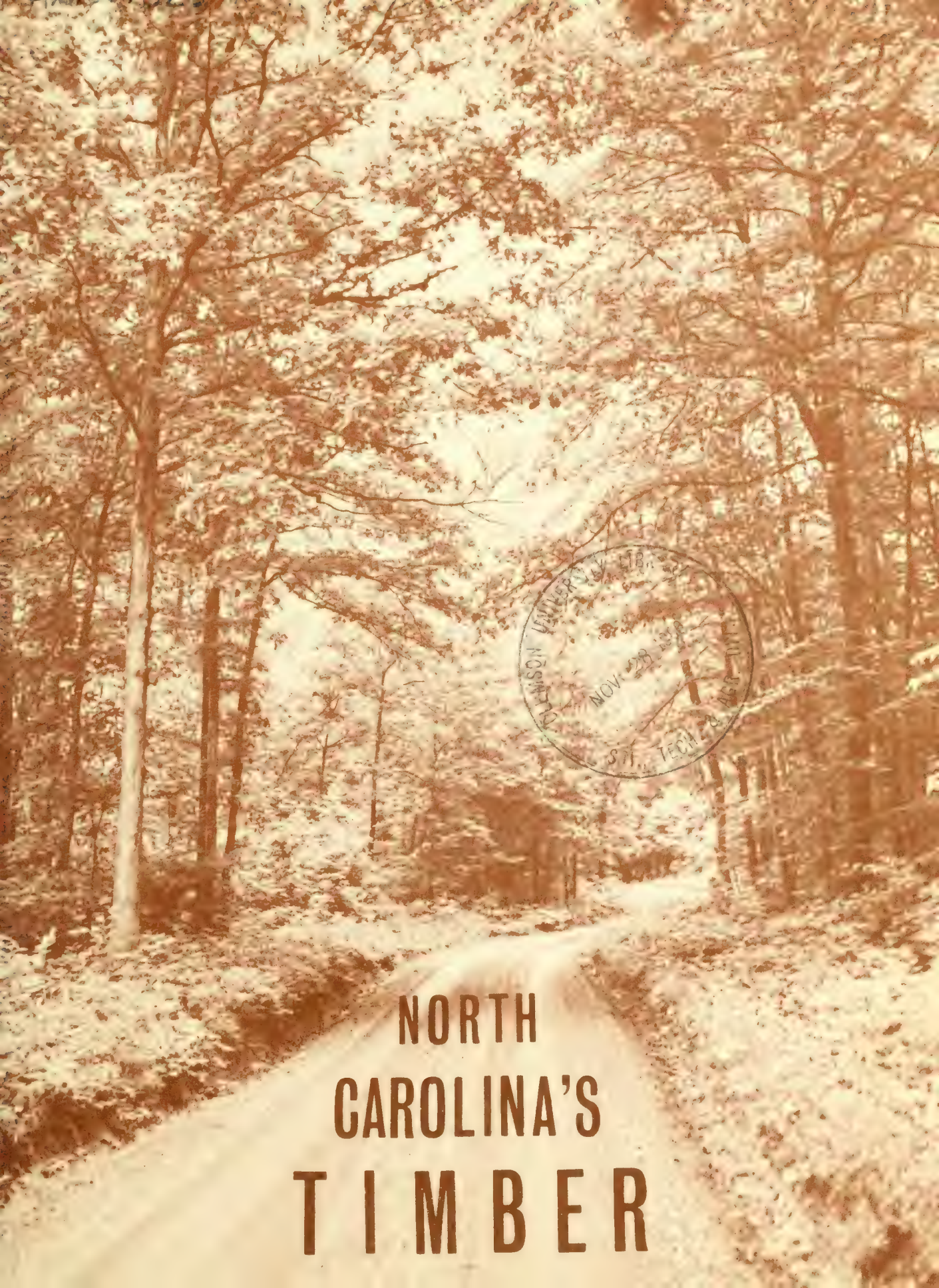
Browse species		Game management class					
		In management area (n = 11)		Out of management area (n = 30)		Total area (n = 41)	
		Plots occupied	Occupied plots used	Plots occupied	Occupied plots used	Plots occupied	Occupied plots used
		Percent					
Desirable: Preferred							
Japanese honeysuckle	Lonicera japonica Thunb.	0.0	--	0.0	--	0.0	--
Greenbrier	Smilax spp.	2.7	0.0	2.0	0.0	2.2	0.0
Desirable: Staple							
Azalea	Rhododendron spp.	0.9	0.0	0.3	0.0	0.5	0.0
Blackgum	Nyssa sylvatica Marsh.	0.9	0.0	13.0	0.0	9.8	0.0
Flowering dogwood	Cornus florida L.	20.9	0.0	17.0	0.0	18.0	0.0
Fringetree	Chionanthus virginicus L.	0.0	--	0.0	--	0.0	--
Grape	Vitis spp.	3.6	0.0	1.7	0.0	2.2	0.0
Hard maple	Acer saccharum Marsh.	5.5	0.0	0.0	—	1.5	0.0
Soft maple	A. rubrum L., A. negundo L.	7.3	0.0	10.0	0.0	9.3	0.0
Serviceberry	Amelanchier spp.	0.9	0.0	0.3	0.0	0.5	0.0
Sourwood	Oxydendrum arboreum (L.) DC.	10.9	0.0	12.0	0.0	11.7	0.0
Sweet-shrub	Calycanthus floridus L.	0.0	--	0.0	--	0.0	—
Viburnum	Viburnum spp.	3.6	0.0	0.7	0.0	1.5	0.0
White ash	Fraxinus americana L.	0.0	--	0.3	0.0	0.2	0.0
Other ash	Fraxinus spp.	0.9	0.0	0.3	0.0	0.5	0.0
Witch-hazel	Hamamelis virginiana L.	0.0	--	0.3	0.0	0.2	0.0
Yellow jessamine	Gelsemium sempervirens (L.) Ait. f.	0.0	--	0.3	0.0	0.2	0.0
Yellow-poplar	Liriodendron tulipifera L.	0.0	--	0.3	0.0	0.2	0.0
Undesirable: Emergency							
Black oak	Quercus velutina Lam.	0.0	--	0.0	--	0.0	--
Chestnut oak	Q. prinus L.	0.9	0.0	3.0	0.0	2.4	0.0
Post oak	Q. stellata Wangenh.	0.9	0.0	0.7	0.0	0.7	0.0
Scarlet oak	Q. coccinea Muenchh.	0.9	0.0	0.7	0.0	0.7	0.0
Scrub red oaks	Quercus spp.	3.6	0.0	1.7	0.0	2.2	0.0
Southern red oak	Q. falcata Michx.	0.0	--	0.3	0.0	0.2	0.0
Water & willow oak	Q. nigra L. & Q. phellos L.	0.0	--	0.0	--	0.0	--
White oak	Q. alba L.	0.9	0.0	2.7	0.0	2.2	0.0
Black cherry	Prunus serotina Ehrh.	1.8	0.0	0.3	0.0	0.7	0.0
Other cherries	Prunus spp.	0.9	0.0	0.0	--	0.2	0.0
Blueberries	Vaccinium spp.	12.7	0.0	3.3	0.0	5.9	0.0
Common sweetleaf	Symplocos tinctoria (L.) L'Her.	0.0	--	0.0	--	0.0	--
Common persimmon	Diospyros virginiana L.	0.9	0.0	1.0	0.0	1.0	0.0
Cucumbertree	Magnolia acuminata L.	0.0	--	0.3	0.0	0.2	0.0
Other magnolias	Magnolia spp.	0.0	--	0.0	--	0.0	—
Eastern redcedar	Juniperus virginiana L.	0.0	--	0.0	--	0.0	--
Eastern redbud	Cercis canadensis L.	0.0	--	0.0	--	0.0	—
Mountain-laurel	Kalmia latifolia L.	3.6	0.0	6.7	0.0	5.9	0.0
Sweetgum	Liquidambar styraciflua L.	0.9	0.0	0.7	0.0	0.7	0.0
Undesirable: Stuffing							
Alder	Alnus spp.	1.8	0.0	2.3	0.0	2.2	0.0
American beech	Fagus grandifolia Ehrh.	0.0	--	0.0	--	0.0	—
American holly	Ilex opaca Ait.	0.9	0.0	5.0	0.0	3.9	0.0
American hornbeam (Bluebeech)	Carpinus caroliniana Walt.	0.0	--	0.0	--	0.0	--
Buckeye	Aesculus spp.	0.9	0.0	0.0	--	0.2	0.0
Eastern hophornbeam	Ostrya virginiana (Mill.) K. Koch	0.0	--	0.0	--	0.0	--
Elm	Ulmus spp.	0.0	--	0.3	0.0	0.2	0.0
Hackberry	Celtis spp.	0.9	0.0	0.0	--	0.2	0.0
Hawthorn	Crataegus spp.	0.9	0.0	0.3	0.0	0.5	0.0
Hickory	Carya spp.	4.5	0.0	4.0	0.0	4.1	0.0
Loblolly pine	Pinus taeda L.	0.0	--	2.0	0.0	1.5	0.0
Longleaf pine	P. palustris Mill.	0.0	--	0.0	--	0.0	--
Shortleaf pine	P. echinata Mill.	0.0	--	2.7	0.0	2.4	0.0
Virginia pine	P. virginiana Mill.	1.8	0.0	0.7	0.0	0.5	0.0
Virginia creeper	Parthenocissus quinquefolia (L.) Planch.	0.0	—	0.0	--	0.0	--

Table 22.--Species dominant on one or more plots, ranked by total percent of points occupied for all timber types on the Uwharrie National Forest

Browse species		Browse rank	Game management class					
			In management area (n = 39)		Out of management area (n = 137)		Total area (n = 176)	
			Plots occupied	Occupied plots used	Plots occupied	Occupied plots used	Plots occupied	Occupied plots used
			Percent					
Flowering dogwood	Cornus florida L.	2	16.15	11.11	11.82	1.85	12.78	4.44
Blackgum	Nyssa sylvatica Marsh.	2	1.28	20.00	14.09	4.66	11.25	5.05
Sourwood	Oxydendrum arboreum (L.) DC.	2	7.95	25.81	10.73	1.36	10.11	5.62
Soft maple	Acer rubrum L., A. negundo L.	2	6.92	11.11	9.93	0.00	9.26	1.84
American holly	Ilex opaca Ait.	4	8.20	0.00	6.50	0.00	6.88	0.00
Blueberries	Vaccinium spp.	3	10.51	7.32	4.82	0.00	6.08	2.80
Mountain-laurel	Kalmia latifolia L.	3	3.59	0.00	5.26	0.00	4.89	0.00
Shortleaf pine	Pinus echinata Mill.	4	2.05	0.00	3.72	0.00	4.35	0.00
Chestnut oak	Quercus prinus L.	3	4.87	0.00	2.85	0.00	3.30	0.00
Loblolly pine	Pinus taeda L.	4	0.00	--	4.01	0.00	3.12	0.00
Japanese honeysuckle	Lonicera japonica Thunb.	1	2.31	88.9	2.63	44.44	2.56	53.33
Hickory	Carya spp.	4	2.31	0.00	2.63	2.78	2.56	2.22
Sweetgum	Liquidambar styraciflua L.	3	0.26	0.00	3.07	0.00	2.44	0.00
Greenbrier	Smilax spp.	1	2.56	50.00	2.04	32.14	2.16	36.84
White oak	Quercus alba L.	3	1.54	0.00	1.97	0.00	1.88	0.00
Scrub oak	Quercus spp.	3	1.79	0.00	1.75	0.00	1.76	0.00
Grape	Vitis spp.	2	3.85	0.00	1.02	0.00	1.65	0.00
Eastern redcedar	Juniperus virginiana L.	3	0.77	0.00	1.82	0.00	1.59	0.00
Common persimmon	Diospyros virginiana L.	3	2.05	12.50	0.88	0.00	1.14	5.00
Azalea	Rhododendron spp.	2	1.79	28.57	0.88	8.33	1.08	15.79
Viburnum	Viburnum spp.	2	1.79	0.00	0.74	10.00	0.96	5.88
Scarlet oak	Quercus coccinea Muenchh.	3	0.26	0.00	1.17	0.00	0.96	0.00
Alder	Alnus spp.	4	1.02	0.00	0.88	0.00	0.91	0.00
Hard maple	Acer saccharum Marsh.	2	3.59	0.00	0.00	--	0.80	0.00
Post oak	Quercus stellata Wangenh.	3	0.51	0.00	0.88	0.00	0.80	0.00
Virginia pine	Pinus virginiana Mill.	4	1.28	0.00	0.66	0.00	0.80	0.00
Common sweetleaf	Symplocos tinctoria (L.) L'Her.	3	1.28	0.00	0.22	0.00	0.45	0.00
Southern red oak	Quercus falcata Michx.	3	0.00	--	0.36	0.00	0.28	0.00
American hornbeam (Bluebeech)	Carpinus caroliniana Walt.	4	0.00	--	0.36	0.00	0.28	0.00
Hawthorn	Crataegus spp.	4	0.26	0.00	0.29	0.00	0.28	0.00
Longleaf pine	Pinus palustris Mill.	4	0.00	--	0.36	40.00	0.28	40.00
Yellow jessamine	Gelsemium sempervirens (L.) Ait. f.	2	0.00	--	0.29	0.00	0.23	0.00
Yellow-poplar	Liriodendron tulipifera L.	2	0.26	0.00	0.22	33.33	0.23	25.00
Black cherry	Prunus serotina Ehrh.	3	0.51	0.00	0.14	0.00	0.23	0.00
Other cherries	Prunus spp.	3	0.26	0.00	0.22	33.33	0.23	25.00
Serviceberry	Amelanchier spp.	2	0.26	0.00	0.14	0.00	0.17	0.00
Black oak	Quercus velutina Lam.	3	0.00	--	0.22	0.00	0.17	0.00
American beech	Fagus grandifolia Ehrh.	4	0.26	0.00	0.14	0.00	0.17	0.00
White ash	Fraxinus americana L.	2	0.00	--	0.14	0.00	0.11	0.00
Other ash	Fraxinus spp.	2	0.26	0.00	0.07	0.00	0.11	0.00
Witch-hazel	Hamamelis virginiana L.	2	0.00	--	0.14	0.00	0.11	0.00
Eastern redbud	Cercis canadensis L.	3	0.00	--	0.14	0.00	0.11	0.00
Fringetree	Chionanthus virginicus L.	2	0.00	--	0.07	0.00	0.06	0.00
Sweet-shrub	Calycanthus floridus L.	2	0.00	--	0.07	0.00	0.06	0.00
Water & willow oak	Quercus nigra L. & Q. phellos L.	3	0.00	--	0.07	0.00	0.06	0.00
Cucumbertree	Magnolia acuminata L.	3	0.00	--	0.07	0.00	0.06	0.00
Other magnolias	Magnolia spp.	3	0.00	--	0.07	0.00	0.06	0.00
Buckeye	Aesculus spp.	4	0.26	0.00	0.00	--	0.06	0.00
Eastern hophornbeam	Ostrya virginiana (Mill.) K. Koch	4	0.00	--	0.07	0.00	0.06	0.00
Elm	Ulmus spp.	4	0.00	--	0.07	0.00	0.06	0.00
Hackberry	Celtis spp.	4	0.26	0.00	0.00	--	0.06	0.00
Virginia creeper	Parthenocissus quinquefolia (L.) Planch.	4	0.00	--	0.07	0.00	0.06	0.00

Table 23.--Species dominant on one or more plots, ranked by total percent of occupied points browsed for all timber types on the Uwharrie National Forest

Browse species		Browse rank	Game management class					
			In management area (n = 39)		Out of management area (n = 137)		Total area (n = 176)	
			Plots occupied	Occupied plots used	Plots occupied	Occupied plots used	Plots occupied	Occupied plots used
			Percent					
Japanese honeysuckle	Lonicera japonica Thunb.	1	2.31	88.9	2.63	44.44	2.56	53.33
Longleaf pine	Pinus palustris Mill.	4	0.00	--	0.36	40.00	0.28	40.00
Greenbrier	Smilax spp.	1	2.56	50.00	2.04	32.14	2.16	36.84
Yellow-poplar	Liriodendron tulipifera L.	2	0.26	0.00	0.22	33.33	0.23	25.00
Other cherries	Prunus spp.	3	0.26	0.00	0.22	33.33	0.23	25.00
Azalea	Rhododendron spp.	2	1.79	28.57	0.88	8.33	1.08	15.79
Viburnum	Viburnum spp.	2	1.79	0.00	0.74	10.00	0.96	5.88
Sourwood	Oxydendrum arboreum (L.) DC.	2	7.95	25.81	10.73	1.36	10.11	5.62
Blackgum	Nyssa sylvatica Marsh.	2	1.28	20.00	14.09	4.66	11.25	5.05
Common persimmon	Diospyros virginiana L.	3	2.05	12.50	0.88	0.00	1.14	5.00
Flowering dogwood	Cornus florida L.	2	16.15	11.11	11.82	1.85	12.78	4.44
Blueberries	Vaccinium spp.	3	10.51	7.32	4.82	0.00	6.08	2.80
Hickory	Carya spp.	4	2.31	0.00	2.63	2.78	2.56	2.22
Soft maple	Acer rubrum L., A. negundo L.	2	6.92	11.11	9.93	0.00	9.26	1.84



NORTH CAROLINA'S TIMBER

CLEMSON UNIVERSITY
NOV 28 1956
S.T. TECH & WILDLIFE

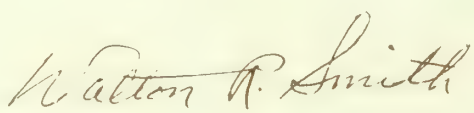
Foreword

This report presents the principal findings of the third Forest Survey of North Carolina's timber resource. The survey, conducted by the Southeastern Forest Experiment Station, was begun in August 1961 and completed in November 1964. Results of two previous surveys, completed in 1938 and 1956, provide the basis for evaluating and interpreting the significance of trends and changes in the timber resource situation.

Forest Survey, a nationwide project of the U. S. Forest Service, is a continuing undertaking designed to provide sound resource data essential to formulation of forest policies and programs at National, State, and local levels. In addition to periodic timber inventories, estimates of timber growth, depletion, and consumption are made which supply forestry interests at all levels with data needed to relate present forest trends, conditions, and timber volumes to probable future timber requirements. At the Southeastern Forest Experiment Station, Forest Survey is a function of the Division of Marketing, Utilization, and Resources Research.

The combined efforts of many people have gone into the Forest Survey in North Carolina. The Station wishes to acknowledge the cooperation of the Tennessee Valley Authority in assisting in the field work in Cherokee, Clay, Mitchell, and Yancey Counties. Acknowledgment is also due the Forestry Division of the North Carolina Department of Conservation and Development for its surveys of timber products output which provided additional information for the report.

Joe P. McClure, leader of the project and co-author, organized and coordinated the various phases of the Survey. Richard L. Welch and Noel D. Cost supervised the collection of the field data. Aerial photo preparation and interpretation and the data computations were supervised by William H. B Haines. Co-author Herbert A. Knight was in charge of the analysis and reporting.



WALTON R. SMITH, Assistant Director
Division of Marketing, Utilization, and
Resources Research

U. S. FOREST SERVICE
RESOURCE BULLETIN SE-5

NORTH CAROLINA'S TIMBER

by

HERBERT A. KNIGHT, Associate Resource Analyst
and
JOE P. McCLURE, Principal Resource Analyst

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SOUTHEASTERN FOREST EXPERIMENT STATION
ASHEVILLE, NORTH CAROLINA

1966

Contents

	Page
Highlights	1
Timber trends	3
More forest area	3
Ownership patterns change	3
Better stocking	4
Hardwood forest types gain	4
More timber volume	4
Less net growth	5
Timber products output	7
Saw logs lead all other products	7
Pulpwood production sets record	7
Veneer logs another major product	7
Miscellaneous products	9
Plant residues	11
Fuelwood consumption is down	11
Substantial volume of timber cut is not used	11
Timber supply outlook	13
Prospective available cut	13
Potential available cut	13
Basis for projections	14
Timber quality	16
Management opportunities	17
Growth	17
Stand improvement	17
Regeneration	17
Protection	17
Utilization	17
Conditions in general	18
Appendix	20
Accuracy of the survey	20
How the forest inventory is made	20
Definitions of terms	21
Index to detailed tables	25

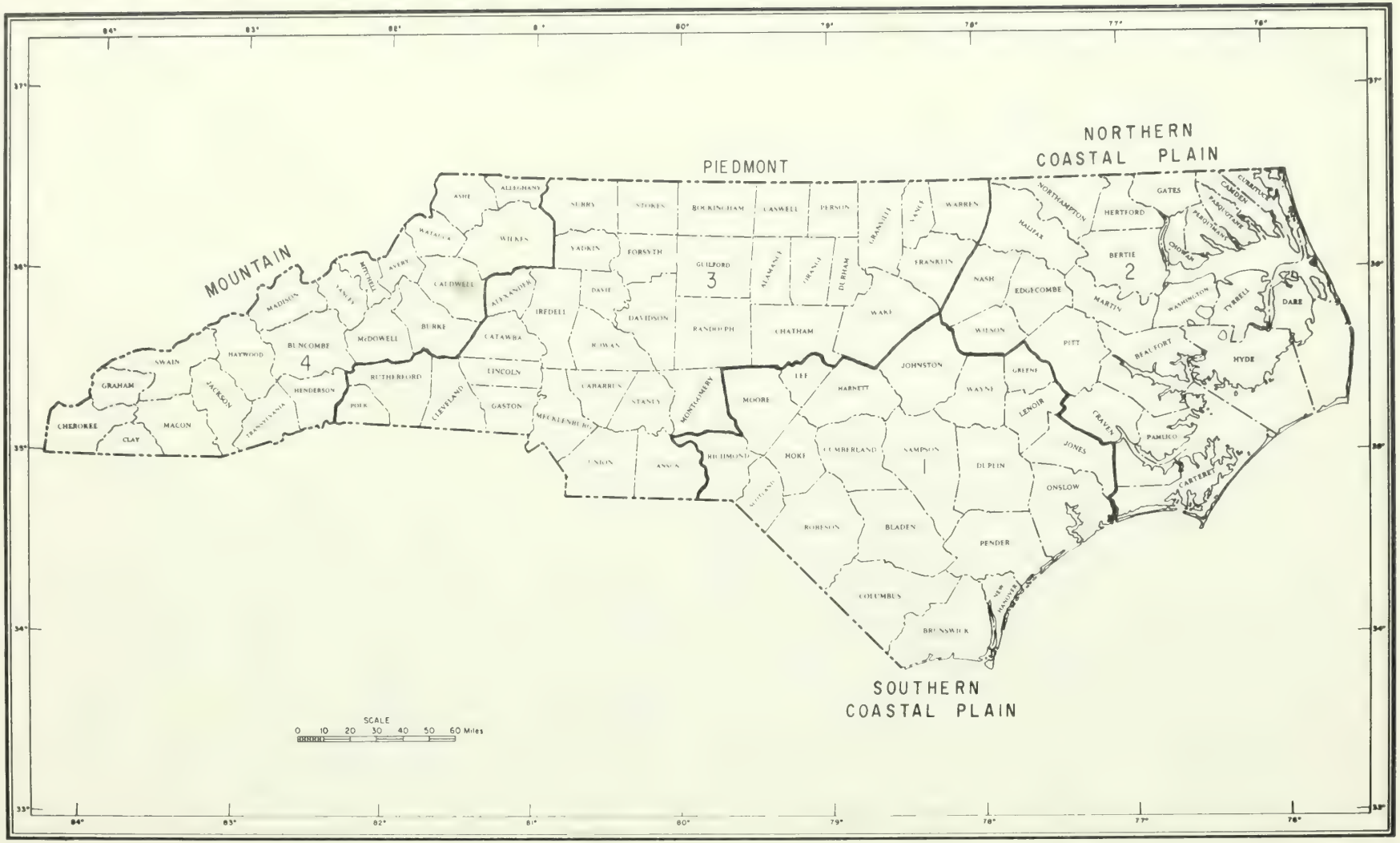


Figure 1. *Forest Survey Units in North Carolina.*

Highlights

Forest area continues to increase. Area of commercial forest land in North Carolina has increased by 1.9 million acres since 1938, to a total of 20.0 million acres, but the rate of increase has declined in recent years. Slightly over one-half of the increase has occurred in the Piedmont, Forest Survey Unit 3 (fig. 1). Today, 64 percent of all land area qualifies as commercial forest and places North Carolina fifth in the Nation in area of commercial timberland.

Farm holdings are down. There has been a sharp reduction in farm holdings within the private ownership pattern of commercial forest land. Today, farmers own less than one-half the commercial forest land in North Carolina, compared to two-thirds in 1955. Virtually all of the shift has been from farmer to a variety of other private owners. Public-owned lands, which make up less than 10 percent of the total, have remained relatively stable.

Mixed stands are increasing. Forests which have an oak-pine cover type have increased by 1.5 million acres since 1955, to a total of 3.6 million acres. These are forests in which southern pine makes up at least 25 percent but less than 50 percent of the stand.

Average stand density is up. Stand densities have tended to increase over the past 26 years. In 1938, the average stand of all live trees 1.0 inch and larger averaged 63 square feet of basal area per acre. By 1955, this average had increased to 73 square feet and is now up to 80 square feet. Nongrowing-stock trees now comprise about 19 percent of the basal area, compared to 26 percent in 1955.

Timber volume is increasing. Since 1938, the volume of softwood growing stock has increased 8 percent, and the volume of hardwood 42 percent. Almost all of the increase in softwood volume has occurred since 1955, but the rate of increase in hardwoods has tapered off during the past 9 years.

Pine sawtimber makes a comeback in the Coastal Plain. The downward trend in volume of pine sawtimber shown in 1955 has now been reversed in the Coastal Plain. The decline of pine sawtimber continues in the Piedmont, but at a slower rate than that which occurred between 1938 and 1955. A relatively small proportion of North Carolina's pine sawtimber occurs in the Mountains, where the trend is upward.

Volume of cypress is declining. Since 1938, the volume of cypress sawtimber has declined 17 percent and growing stock 24 percent. Cypress volume has decreased faster since 1955 than between the first two surveys. Most of the cypress grows in the Northern Coastal Plain.

Net growth drops off. In 1963, the net growth of growing stock was down almost 7 percent, compared to 1955. This reduction in net growth resulted from heavier mortality and a decrease in the growth rate, probably in response to higher stand densities with improper spacing. When all species were grouped, the rate of gross growth as related to inventory was down almost 12 percent in 1963, compared to 1955.

Margin of net growth over cut narrows. Net growth continues to exceed cut in both softwood and hardwood but the margin is narrowing. In 1955, growth of hardwood growing stock was over 1½ times greater than cut. By 1963 this margin had narrowed to 32 percent. In 1955, growth of softwood growing stock exceeded cut by 21 percent, but by 1963 this margin had narrowed to 16 percent. The growth-

cut ratio for softwood sawtimber is an exception to the trend in that growth over cut has increased slightly because of a decline in cut.

Greater use is made of plant byproducts. More complete utilization of roundwood output has contributed to the increase in inventory. Over one-fifth of all pulpwood produced in North Carolina in 1964 came from slabs, edgings, veneer cores, trimmings, and other byproducts, compared to a negligible amount from these sources as recent as 1955. To the pulp industry today, this residue volume serves as the equivalent of over 550,000 cords of growing stock each year. In spite of this progress, however, an estimated 100,000 cords of plant residues suitable for chipping were unused in 1964.

The pulp industry is expanding. Pulping capacity at North Carolina's 5 pulpmills has increased 75 percent within the past 10 years and now exceeds 4,500 tons per day. In 1964, almost 2.1 million cords of round pulpwood were cut from North Carolina's forest, compared to slightly over 1.5 million cords in 1954.

A new wood-using industry is introduced. The first southern pine plywood plant constructed in North Carolina began operations in mid-1965. Three pine plywood plants are now in operation or under construction in the Coastal Plain with a combined annual capacity approaching 200 million square feet (3/8-inch basis).

Lumber production is down. Between 1956 and 1960, reported lumber production dropped almost 33 percent, with most of the decrease occurring in softwood. Since 1960, annual production has tended to level off at about 1.3 billion board feet. The lumber industry still outranks all other primary wood-using industries in volume of timber consumed annually.

Net growth is well below potential. There are numerous opportunities to increase growth through better management. About 30 percent of the growing space in commercial forest land is nonstocked or occupied by shrubs and nongrowing-stock trees. To bring this space into timber production calls for more intensified regeneration and stand improvement efforts.

Timber Trends

MORE FOREST AREA

Area of commercial forest land in North Carolina has increased continuously since the first Forest Survey was completed in 1938 (table I). Between 1938 and 1955, area of commercial forest increased at an average rate of more than 70,000 acres per year. Since 1955, the net annual increase has averaged 37,000 acres exclusive of forest land shifting from unproductive to commercial because of a more lenient classification.

Although planting and natural restocking of idle and abandoned farmland have more than offset the loss of timberland to other land uses, some people have expressed concern over the amount of land that is being permanently removed from any future timber production. As the population increases, the expanding residential areas, industrial sites, highways, airports, reservoirs, transmission lines, and parks become more noticeable. Between 1955 and 1964, the increase in these land uses averaged over 40,000 acres annually. A large share of this land going into urban and other uses, however, has come from agricultural land. To date, the inroads into commercial forests have not been large enough to reduce significantly the supply of timber. There are still over 800,000 acres of idle nonforest land in North Carolina.

OWNERSHIP PATTERNS CHANGE

Adjustments in agricultural activities, particularly in the Piedmont and Mountains, have contributed to a decrease of 4 million acres in farmer-owned forest land over the past 9 years. Most of this shift in ownership has been from farmers to the miscellaneous private group, where interests in forestry range from none to the most advanced.

Because conditions of forest lands, the amount and kind of forest management applied, prospective timber growth, and availability all depend to a great extent upon the decisions of the owners and managers of the forests.

Table I.—*Commercial forest area by Survey Unit, North Carolina, 1938, 1955 and 1964*

Survey Unit	1938	1955	1964	Change 1955-1964
	Thousand acres			
Southern Coastal Plain	5,544.3	5,388.9	5,653.8	+264.9
Northern Coastal Plain	4,045.5	4,140.4	4,302.4	+162.0
Piedmont	4,968.1	5,821.1	6,014.6	+193.5
Mountain	3,543.8	3,991.0	4,056.5	+ 65.5
State total	18,101.7	19,341.4	20,027.3	+685.9

large-scale changes in the ownership pattern are of major interest. When the average condition of stands owned by farmers is compared to that of the miscellaneous private group, there seems to be no significant difference at present. It is probably too early, however, to draw any firm conclusions about the relationship of forest management to either ownership class or size because present stand conditions still reflect past treatment, even on forest-industry lands.

Collectively, individuals who own less than 500 acres of forest land hold about 60 percent of the commercial timberland. Over one-third of the total commercial forest land is held by individuals who own less than 100 acres. In the past, these small landowners have provided a large share of the timber cut in North Carolina, and the future timber supply will still depend on their contribution.

Most forest-industry holdings are found in the Coastal Plain, where forest industry owns about one-fourth of all commercial timberland in the Northern Coastal Plain and over 16 percent of the total in the Southern Coastal Plain. Historical ownership information is not available from previous surveys and it is there-

fore impossible to report a reliable trend in this ownership class. Most of the holdings in this class exceed 50,000 acres.

There has been only a small increase in the acreage of public-owned commercial forest since 1955. In fact, its proportion of the State total has remained about 8.5 percent. These public-owned timberlands are largely confined to the Mountains, where about one-fifth of the commercial forest land is in National Forest ownership. In addition, there are approximately 350,000 acres of productive-reserved forest land in the Mountains. Most of this reserved acreage is in the Great Smoky Mountains National Park and along the right-of-way of the Blue Ridge Parkway, both of which are administered by the Department of the Interior.

BETTER STOCKING

Along with the increase in forest area there has been an improvement in stocking. Today, 64 percent of the commercial forest land is 70 percent or better stocked with growing-stock trees, compared to 58 percent in 1955. Over this same period, the proportion of commercial forest land that is less than 40 percent stocked with growing stock declined from 18 to 8 percent.

Hardwoods make up a higher proportion of total stocking today than in the past, and they now account for 66 percent of total stocking of all live trees 1.0 inch and larger, compared to 63 percent in 1955 and 58 percent in 1938. Two out of every five of these hardwood trees fail to qualify as growing stock, however, because of poor form, rot, roughness, or noncommercial species; over 90 percent of the softwood trees qualify as growing stock. Because the growing-stock classification is based on a sawlog standard, many of the remaining trees can be used by industries that depend primarily upon wood fiber.

HARDWOOD FOREST TYPES GAIN

Natural hardwood encroachment, assisted by the heavier demand that is generally placed upon the pine component in mixed forests, has resulted in a further increase in hardwood forest types. In 1955, hardwood cover types occupied about 56 percent of the commercial forest land, compared to 64 percent in 1964. The oak-pine and oak-hickory types have expanded at the expense of the softwood types. There has been little change in the bottomland hardwood types.[1]

MORE TIMBER VOLUME

The increase in forest area and stocking has been accompanied by an increase in volume of both softwood and hardwood (fig. 2). Between 1938 and 1955, a 33-percent increase in the volume of hardwood growing stock overshadowed a negligible gain in softwood volume. For North Carolina as a whole, both softwood and hardwood growing stock have increased 7 percent since 1955. The fact that hardwoods are now providing a greater share of total cut than in the past seems to be bringing the demand into somewhat better balance with the inventory in terms of species composition.

There is also an upward trend in sawtimber volume. Since 1955, softwood and hardwood sawtimber have increased 10 and 5 percent,

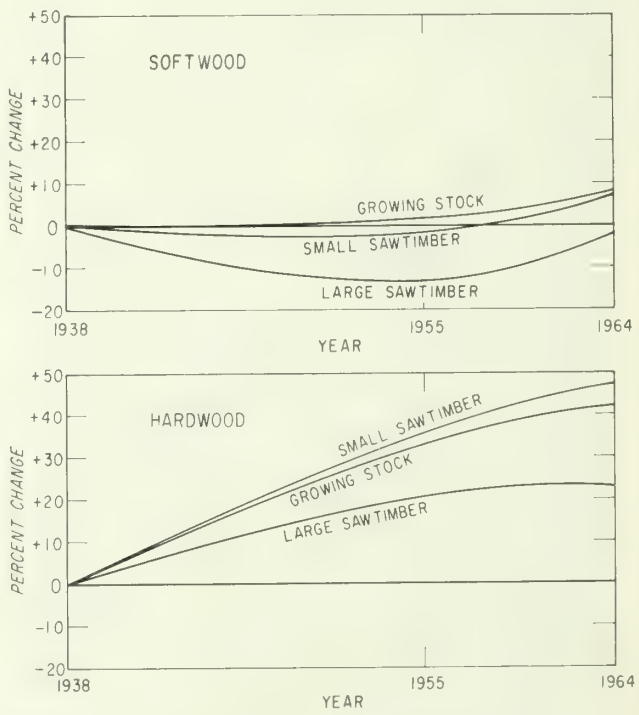


Figure 2. *Percent change in timber volume in North Carolina since 1938.*

[1] A map detailing the major forest types in the South is available, upon request, from the Southeastern Forest Experiment Station. The scale is 40 miles to the inch.

respectively. Between the first and second surveys, softwood declined 6 percent and hardwood rose 26 percent. Pine sawtimber has made a comeback in the Coastal Plain, and hardwood continues to increase in the Piedmont and Mountains. Cypress is declining, but it makes up a relatively small share of total volume.

In the Southern Coastal Plain, net volume of sawtimber averages 2,370 board feet per acre, about the same as in 1955. Softwoods comprise about 60 percent of this volume. Loblolly pine, with 5.4 billion board feet, is the predominating species, followed by pond pine and longleaf pine. Blackgum, sweetgum, and tupelo combined make up over one-half the hardwood sawtimber volume, with a variety of oaks, yellow-poplar, and soft maple comprising most of the remaining volume.

Highest average volumes are found in the Northern Coastal Plain, where sawtimber volume per acre has increased from 3,960 to 4,170 board feet since 1955. Species composition differs little from that found in the Southern Coastal Plain. Loblolly pine, with almost 8.3 billion board feet, is by far the most important species.

Smallest average volume of sawtimber per acre, 2,033 board feet, is found in the Piedmont, where poletimber and sapling and seedling stands occupy a relatively high percentage of the forest. When comparisons are based on average cubic-foot volume per acre, however, average volume in the Piedmont is greater than in the Southern Coastal Plain. Shortleaf and loblolly pines, with 4.4 billion board feet, are the leading softwood species, with Virginia pine next in importance. In contrast to 41 percent in the Coastal Plain, hardwoods comprise 57 percent of the sawtimber volume in the Piedmont. White oak, yellow-poplar, sweetgum, hickory, scarlet oak, and red maple are the predominant hardwood species and comprise about two-thirds of the hardwood sawtimber. Most of the remaining hardwood consists of a mixture of other white and red oaks, river birch, beech, and sycamore.

In the Mountains, sawtimber volume per acre has risen from 2,440 to 2,653 board feet since 1955. Hardwoods predominate in this area and account for over three-fourths of the total board-foot volume (fig. 3. Chestnut oak, yellow-poplar, scarlet oak, northern red oak, white oak, and hickory are the leading hardwood species. About 61 percent of the board-foot volume of hardwoods is in trees 15.0 inches

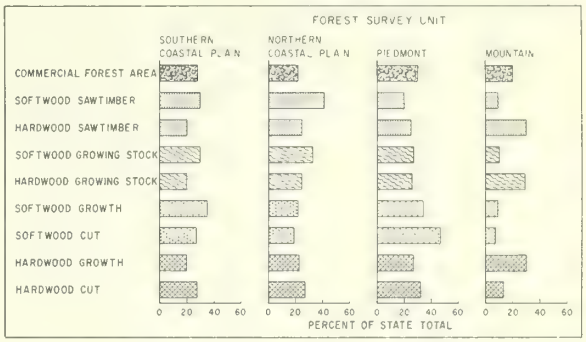


Figure 3. *Relative importance of forest resource by Survey Unit, North Carolina, 1964.*

d.b.h. and larger. White pine, shortleaf, pitch, and Virginia pines, and hemlock are the principal softwood species in the Mountains.

LESS NET GROWTH

Growth still exceeds cut, but net growth is down for both softwood and hardwood, compared to 1955 (fig. 4). Net growth is 13 percent lower for softwood sawtimber and 4 percent for growing stock. In hardwood, net growth has declined 12 percent for sawtimber and 10 percent for growing stock.

This trend raises the question of what has caused this decrease in net growth. The statistics show that a combination of heavier mortality and a decrease in the rate of gross growth accounts for the reduction. The 1963 survey figures show that mortality reduced the growth of softwood and hardwood growing stock by 14 and 19 percent, respectively, compared to 10 percent for both softwood and hardwood in 1955. Gross growth as related to inventory declined from 6.0 to 5.3 percent for all species —possibly the result of increased density with improper spacing. Natural regeneration from inadequate seed sources has tended to produce

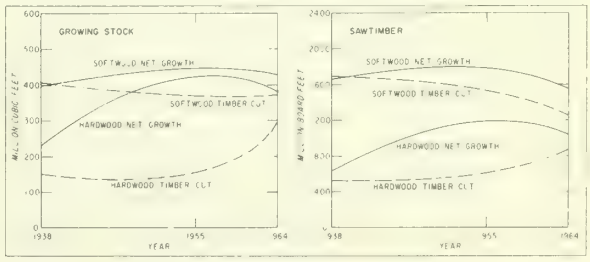


Figure 4. *Trend in net growth and timber cut in North Carolina since 1938.*

irregular stands which have less than optimum growth potential.

The fact that this latest survey shows hardwood mortality almost double that in 1955 and softwood mortality up 39 percent must be evaluated carefully. The latest survey was the first to utilize remeasurements made on the permanent sample plots established in 1955. Mortality figures are now based on an average of the losses occurring over the 9-year interval between 1955 and 1964. Mortality estimates on previous surveys were based on the single year preceding the survey, which may not have been the most representative year. The increase in mortality for 1963 over that of 1955, as shown by the plot data, may well represent, in large part, this change in sampling techniques.

In both surveys, the exact cause of death in many instances was impossible to determine and was recorded as unknown. During the remeasurement period between 1955 and 1963, suppression, particularly in overcrowded stands, was one of the leading causes of death and, because of its inconspicuous nature, mortality from suppression often gains little attention. In 1963, North Carolina experienced its worst fire year since 1955 in terms of area burned, and the result was a considerable loss of timber, particularly in the Coastal Plain. Other leading identifiable causes of death included pine bark beetles and littleleaf disease, the latter confined to the Piedmont. An outbreak of the elm spanworm in the Mountains existed for several years and resulted in considerable damage to the hardwoods and, in some instances, led to mortality. The balsam woolly aphid represents still another cause of death and continues to present a threat to the small remaining area of Fraser fir. Many rot fungi plague the hardwoods throughout the State and, although they are not leading causes of death, they have the biggest impact of all the diseases on net increment.

The loss of timberland to other uses has been offset by the planting and natural restocking of idle and abandoned farmland. —Photo by Forestry Div., N. C. Dept. Conservation and Development.

Timber Products Output

Annual timber cut shown in tables 21 to 24 and in table 45 of this report is based on trend level between 1955 and 1963 as developed from the remeasurement of permanent sample plots, and should not be confused with annual timber cut shown in tables 30 and 31, which is based on the 1964 State commodity drain survey. Timber removal for specific years often differs substantially from the trend or average. The estimate of timber cut based on trend level is probably more reliable for describing the current average growth and cut relationship and more nearly explains the changes in the inventory since 1955. On the other hand, the cut figures for a particular year are more useful when cut is related to timber products output. In this section the data obtained in the State commodity drain survey are used and supplemented with information on utilization obtained by Forest Survey.

In 1964, timber products from North Carolina forests totaled about 490 million cubic feet, compared to almost 550 million cubic feet in 1955. Reductions in volume of softwood timber cut for saw logs and both softwood and hardwood cut for domestic fuelwood account for most of this decline. The output of timber products from hardwood has actually increased over this 9-year span.

SAW LOGS LEAD ALL OTHER PRODUCTS

The number of sawmills in North Carolina has declined since 1955, but there were still over 650 active mills in 1964. About 220 of these mills each produced 2 million board feet of lumber or more. The lumber industry consumes slightly more growing-stock timber annually than do all other wood-using industries combined. Reported softwood lumber production dropped off sharply between 1956 and 1960, but has tended to level off in more recent years. Hardwood lumber production has fluctuated from year to year, but the general level of production has remained about the same since 1950, with only a very small decrease in average annual production (fig. 5).

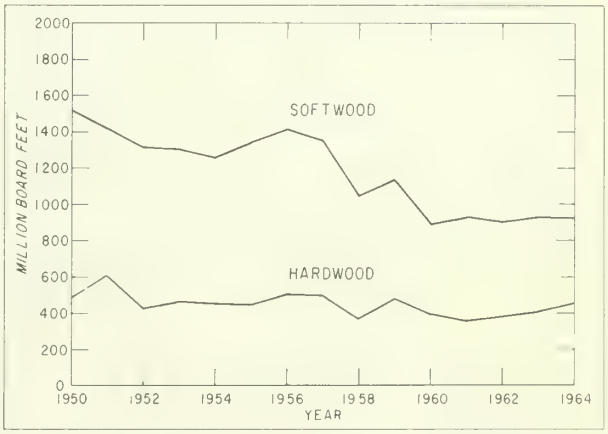


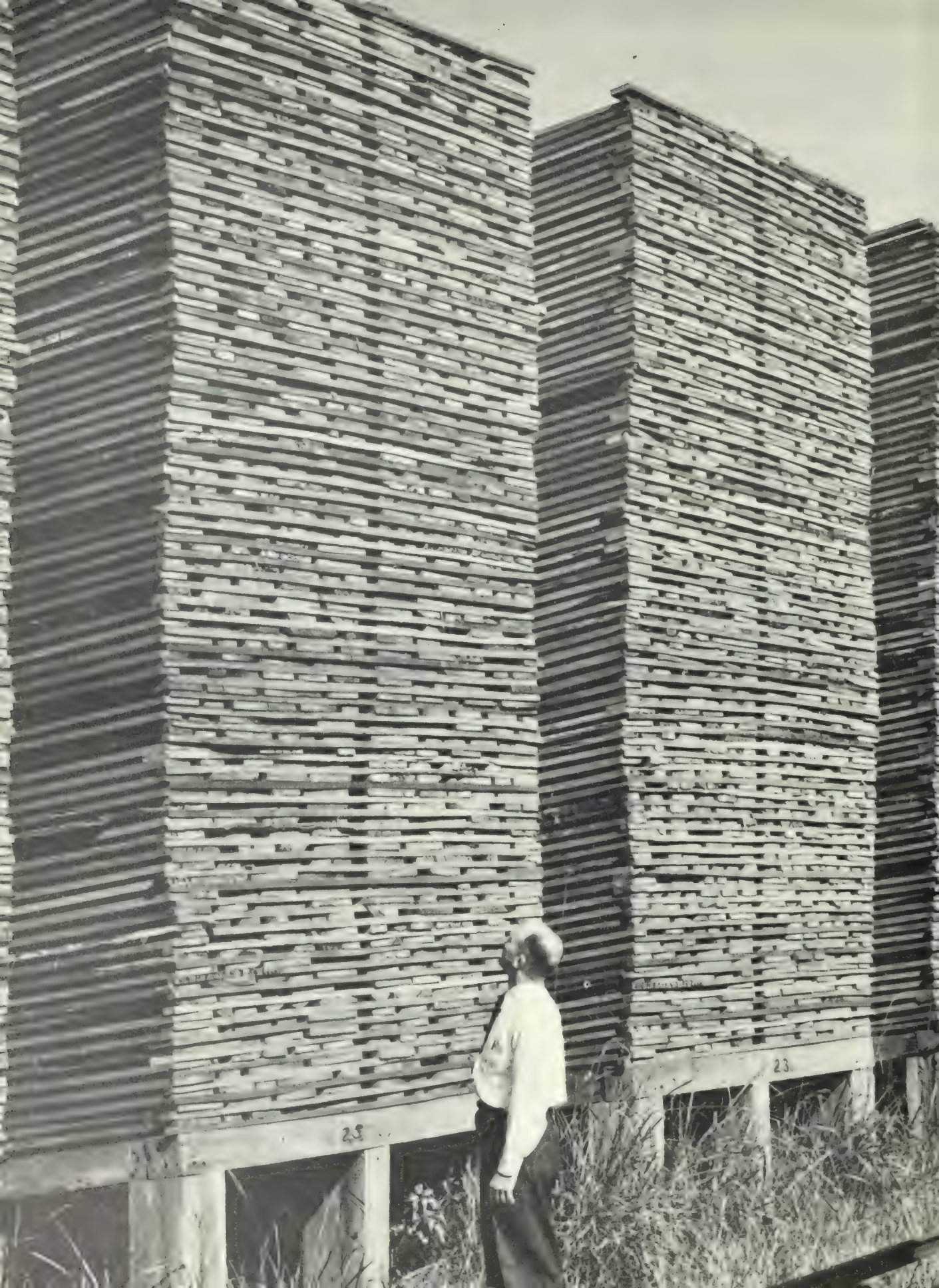
Figure 5. *Lumber production in North Carolina, 1950 to 1964.*

PULPWOOD PRODUCTION SETS RECORD

There are 5 pulpmills in North Carolina, and the pulping capacity at each of these mills has been increased within the past 10 years. In 1964, pulpwood production reached a record high of over 2.6 million cords, and the industry is the second largest consumer of wood in the State. Between 1950 and 1964, annual pine pulpwood production, including chips from residues, increased from 790,000 cords to 1,965,000 cords, and hardwood production rose from 234,000 cords to 659,000 cords (fig. 6).

VENEER LOGS ANOTHER MAJOR PRODUCT

North Carolina is one of the Nation's leading producers of hardwood veneer logs and


23
23

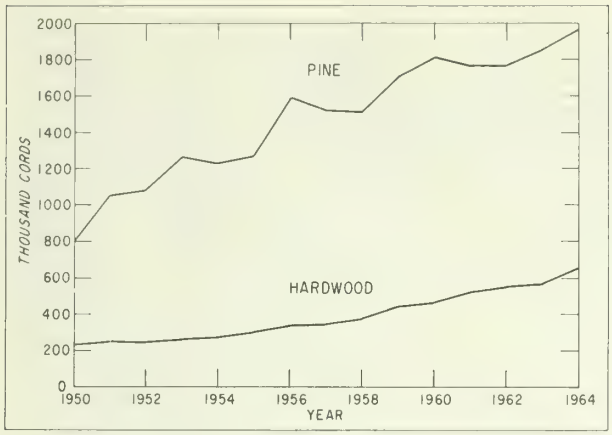


Figure 6. *Pulpwood production in North Carolina, including residues, 1950 to 1964.*

had over 60 active veneer plants in 1964. Most of these plants are concentrated in the Piedmont, where they support the wood furniture industry (fig. 7). Output of hardwood veneer logs in 1964 totaled 155 million board feet, compared to about 122 million board feet in 1955.

The new southern pine plywood industry has moved into the Coastal Plain. Three plants are in operation or under construction there at this time. Based on the announced capacities of these three mills, their annual pine sawtimber requirements will approach 80 million board feet.

MISCELLANEOUS PRODUCTS

In addition to the sawmills, pulpmills, and veneer plants, there are approximately 30 other primary wood-using plants in North Carolina. These plants turn out miscellaneous products that range from treated poles, piling, and posts to cooperage, handles, shuttleblocks, and various kinds of board. The combined out-

North Carolina is one of the Nation's leading producers of hardwood veneer logs.

—Photo courtesy of Carolina Division, Champion Papers Inc., Canton, N. C.

These chipped residues from one of North Carolina's new pine plywood plants will be utilized by a nearby pulpmill.

put of these products in 1964 totaled about 24 million cubic feet, with hardwood providing about two-thirds of this volume.

PLANT RESIDUES

The primary wood-using industries in North Carolina produced an estimated 143 million cubic feet of wood residues in 1964. Slightly over one-half of these residues were either used in the manufacture of fiber products, small dimension, specialty items, or for fuel and litter. Over 65 million cubic feet were not used for any purpose. Of the amount not used, about 46 million cubic feet were fine residues, such as sawdust and shavings, which have very limited use at this time.

FUELWOOD CONSUMPTION IS DOWN

It is difficult to measure the volume of wood burned annually for domestic fuel, but the available data indicate that fuelwood consumption has declined about 60 percent since 1955. In spite of this decrease, it is estimated that North Carolina residents burned 678,000 cords of roundwood in 1964 and, of all wood products produced, fuelwood ranked third in volume. Use of hardwood for fuel far exceeds the use of softwood. Oil, gas, coal, and electricity have been increasingly substituted for wood in home cooking and heating, especially by farm residents who consume most of the fuelwood. Because many of the modern homeowners like to retain some of the environment that surrounded the old-time fireplace, the use of firewood as a luxury may very well influence the trend in the future.

SUBSTANTIAL VOLUME OF TIMBER CUT IS NOT USED

About 24 percent of the cubic-foot volume of growing stock that was cut, girdled, poisoned, or destroyed in 1964 did not go into a product. Unused portions of cut trees and whole trees destroyed in logging operations totaled almost 84 million cubic feet. Logging residues in hardwood ran particularly high. In addition, it is estimated that about 56 million cubic feet were destroyed by land clearing and never reached a market of any kind. A small amount of low-quality hardwood destroyed in cultural treatments met the minimum standards for growing stock.

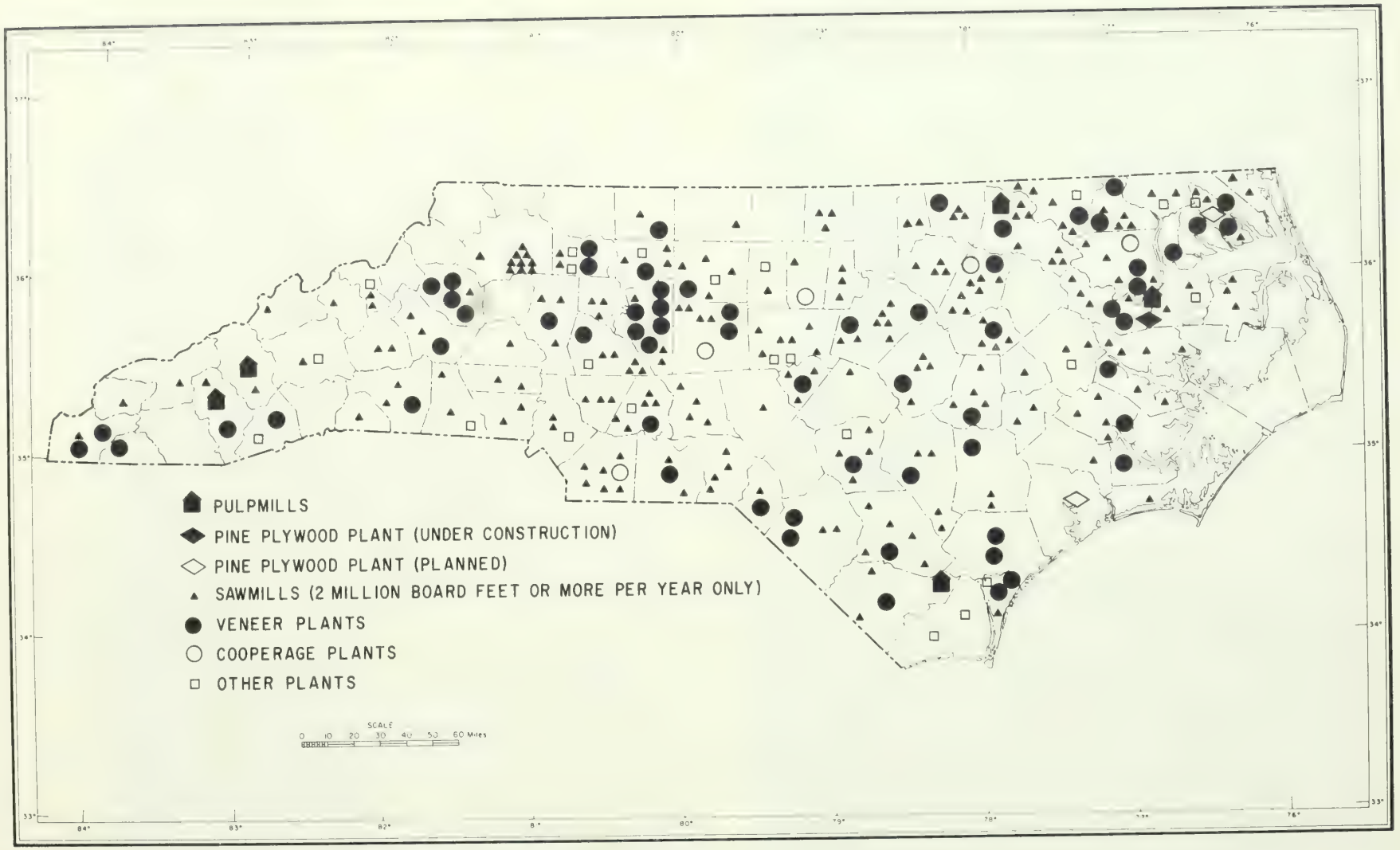


Figure 7. *Location of primary wood-using industries in North Carolina, 1964.*

Timber Supply Outlook

Any long-term projection of timber supply is subject to many uncertainties, and the results largely reflect the assumptions that must be made about future forest area, levels of protection, and other management activities. Nevertheless, by introducing some reasonable assumptions, it is possible to estimate the prospective volume of timber that will be available if the current trend in forest management continues. This estimate can also be compared to the potential volume of timber that would be available annually if the present inventory were improved to the degree that near maximum timber production could be obtained from North Carolina's forest land. The results of projections made for North Carolina and the assumptions used are described in this section. No attempt is made to project the timber supply beyond 50 years or to project timber demand.

PROSPECTIVE AVAILABLE CUT

This first projection was made to obtain estimates of the volume of timber that will be available to forest industries annually, based on assumptions that the difference in cut and growth will gradually diminish until growth equals cut in 50 years, and that the current trend in forest management will continue. This assumes that forest protection, planting, stand improvement, thinning, stand conversion, and improved utilization will counteract any tendency for mortality to increase and radial growth to decrease in response to higher stand densities.

Results from this projection indicate that by the year 2000, available cut from softwood growing stock and sawtimber will increase by 46 and 40 percent, respectively. This means that the present cut from softwood growing stock can be increased from about 370 to over 550 million cubic feet within the next 35 to 40 years. Over the same period, cut from softwood sawtimber can be increased from 1.2 to 1.8 billion board feet (fig. 8). Based on the same assumptions, available cut from hardwood growing stock will more than double by the year 2000, whereas only a 28-percent increase can be expected in available cut from hardwood sawtimber (fig. 9).

These estimates of prospective available cut are gross figures and can mask deficiencies that are likely to occur in the volume of select species, certain tree sizes, and quality material.

POTENTIAL AVAILABLE CUT

A second projection was made to obtain estimates of the volume of timber that could be available to forest industries annually, based on the increase in production that could result from intensified forest management. This would call for an acceleration of management over the next 50 years to develop the inventory needed to sustain a level of productivity that would more nearly reflect the capacity of North Carolina's forest land.

Results from this projection show a potential available cut from softwood growing stock of about 780 million cubic feet at the end of 50 years. Potential available cut from softwood sawtimber over the same period could reach 2.8 billion board feet.

Potential available cut from hardwood growing stock could increase from the present 300 million to slightly over 800 million cubic feet by the year 2013. Although the projections of hardwood growing stock show very little difference between prospective and potential available cut through the year 2000, the latter projection allows for considerable improvement in stand structure and tree quality and an inventory that would sustain a greater cut.

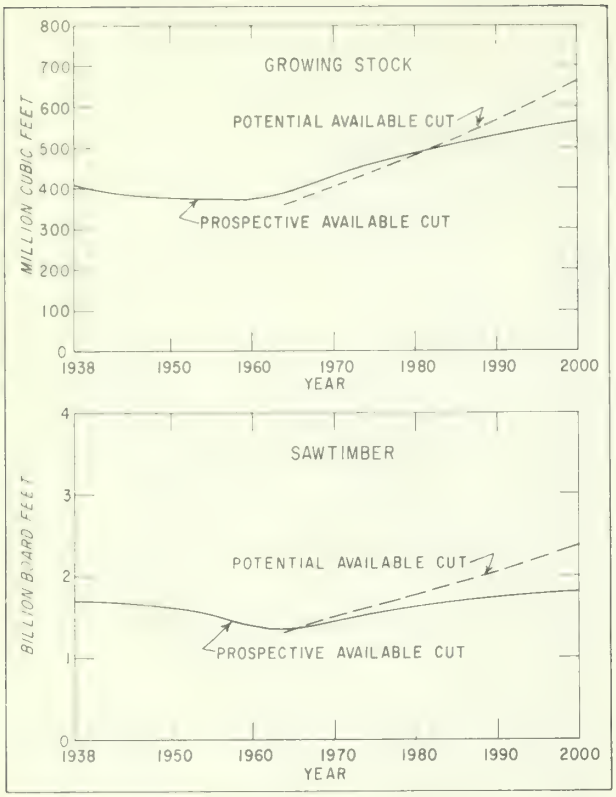


Figure 8. *Prospective and potential available cut, softwood, 1963-2000, North Carolina.*

Potential available cut from hardwood sawtimber could increase from the present 1.0 billion to slightly over 2.0 billion board feet. The reduction of excessive stocking of cull and undesirable hardwood trees through extensive stand improvement efforts provides an opportunity to improve the hardwood situation.

BASIS FOR PROJECTIONS

In these projections for North Carolina, it is assumed that the present acreage with pine cover types will be retained, and that pines will continue to occupy about 40 percent of the area within those stands that now have an oak-pine forest type. This would necessitate a greater control over hardwood encroachment upon upland sites that are better suited for growing pines.

In the second projection, the development of the potential inventory would require management practices that could increase the average basal area per acre across 8.6 million acres of pine and oak-pine stands from 63 to 100 square feet. It is assumed that accelerated management of some 11.4 million acres of hardwood and cypress stands could increase the basal area per acre from 93 to 120 square feet, and at the same time substantially improve the proportion of desirable trees over the next 50 years. Because over 3 million acres of commercial forest land in North Carolina are less than 70 percent stocked with trees of any kind, it seems reasonable to assume that average basal area can be increased without decreasing the growth rate. Poor spacing probably explains present indications that the rate of gross growth is decreasing with the increase in density. Other assumptions are that intensified management could reduce mortality in volume-size trees by 75 percent, and that additional gains could be made in diameter growth and average net volume per tree by proper spacing and improving tree quality.

The present level of forest area was held constant for the purpose of projecting the timber supply in North Carolina. During the past 26 years the area of commercial forest land has been increasing, but within the past 10

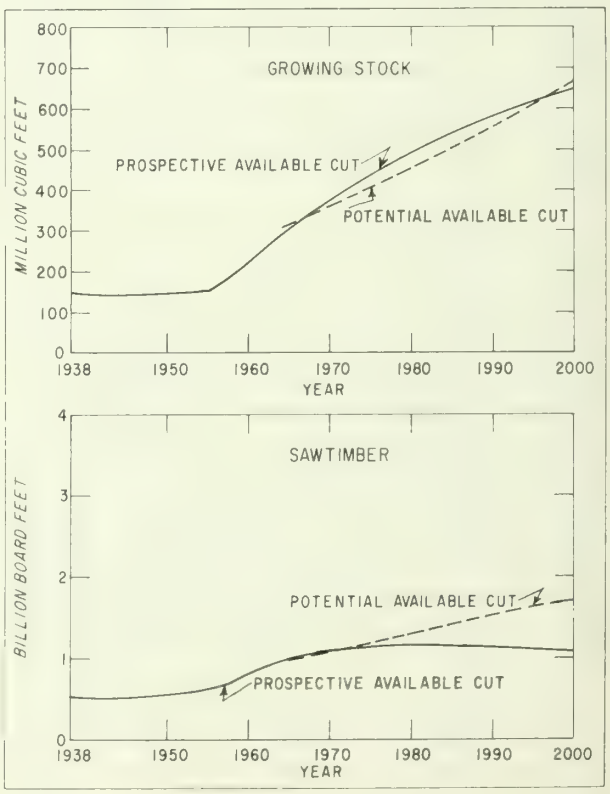


Figure 9. *Prospective and potential available cut, hardwood, 1963-2000, North Carolina.*

years the increase has been at a slower rate. Annual forest planting reached a high of 87,000 acres in 1959; in recent years it has averaged nearer 50,000 acres (table II). Over time, a large part of the 800,000 acres of idle cropland will also revert naturally to forest. However, with the increase in population expected by the year 2000, diversions of forest land to other uses will likely counterbalance the addition of new forest lands. More and more land will be needed for residential areas, industrial sites, highways, airports, reservoirs, and transmission lines.

Table II.—*Acres of forest planting[1] by ownership class, North Carolina, 1954-1964*

Fiscal year	Ownership class				All ownerships	Accumulative total
	National Forest	Other public	Forest industry	Other private		
	Acres					
1954	121	1,010	6,206	9,867	17,204	17,204
1955	1,314	505	10,662	11,345	23,826	41,030
1956	1,901	1,451	18,494	12,270	34,116	75,146
1957	2,219	655	27,046	28,839	58,759	133,905
1958	3,169	1,703	26,968	43,826	75,666	209,571
1959	2,043	1,872	13,670	69,832	87,417	296,988
1960	1,867	1,173	20,411	49,465	72,916	369,904
1961	2,417	1,380	31,824	38,146	73,767	443,671
1962	3,212	1,341	23,176	22,626	50,355	494,026
1963	3,719	1,424	30,157	18,667	53,967	547,993
1964	4,208	2,023	30,286	15,619	52,136	600,129

[1] Includes acres of planting by direct seeding.
Source: U. S. Department of Agriculture, Forest Service, *Tree Planters' Notes*, 1954-1964.

In projecting the timber supply, it is assumed that fire protection efforts would continue at about the present level. In these long-range projections, the number of trees growing into the 2-inch diameter class each year from both natural and planted sources is an important factor, and this ingrowth into the 2-inch diameter class is greatly affected by the success of fire protection efforts. Fire protection in North Carolina has been extended until about 95 percent of the forest area is under protection. Area burned annually has been reduced significantly and, since 1955, protected area burned has been held to less than 100,000 acres each year, with the exceptions of 1957 and 1963 (table III).

An increasing population will demand more land for roads.

Nearly 95 percent of the forest area in North Carolina is now under fire protection.
—Photo by Forestry Div., N. C. Dept. Conservation and Development

TIMBER QUALITY

The large proportion of low-quality timber in the inventory presents a problem. Only 7,290.2 million cubic feet, or 35 percent, of the total net volume is in trees that qualify as desirable. These trees are thrifty and do not have any serious defects in quality that limit present or prospective use. Furthermore, only about 30 percent of this desirable-tree volume is in trees 15.0 inches d.b.h. and larger.

Other growing-stock trees classed as acceptable contain a much larger share, 11,174.5 million cubic feet, of the total volume. These trees do not qualify as desirable because of poor vigor, surface defects, excessive cull, or the presence of damaging agents. Many are of limited value to industries that depend entirely upon the best quality timber.

An additional 2,361.1 million cubic feet of volume is in rough trees and rotten culls which, together with other inhibiting brush, occupy almost 17 percent of the growing space in commercial forests. The prospects are good, however, that continued improvements in utilization technology will make it possible for industries dependent primarily upon wood fiber to use much of this inferior material, especially the 1,413.6 million cubic feet in rough trees.

Table III.—*Forest area under fire protection, protected area burned, number of fires, and average size of fires, North Carolina, 1950-1964*

Year	Forest area protected		Protected area burned		Fires [1]	Average size of fires [1]
	Thousand acres	*Percent* [2]	*Thousand acres*	*Percent*	*Number*	*Acres*
1950	16,614	90.39	463	2.79	4,186	111
1951	16,887	91.86	189	1.12	3,495	54
1952	17,029	92.57	320	1.88	4,035	79
1953	17,049	92.65	163	.96	3,291	49
1954	17,073	92.79	211	1.24	4,326	49
1955	17,178	93.35	656	3.82	3,817	172
1956	17,138	93.11	89	.52	3,120	28
1957	18,299	92.19	152	.83	2,349	65
1958	18,300	92.19	55	.30	2,615	21
1959	18,691	94.20	86	.46	3,134	27
1960	18,780	94.54	77	.41	3,136	25
1961	18,761	94.55	60	.32	3,535	17
1962	18,764	94.55	55	.29	3,267	17
1963	18,774	94.56	281	1.50	4,910	57
1964	18,816	94.57	38	.20	3,424	11

[1] Fires on unprotected area are not included.
[2] Percent of commercial forest area.

Management Opportunities

GROWTH

Present net growth is far below potential in North Carolina. About 15.2 million acres, or 76 percent, of the commercial forest land is capable of growing 50 cubic feet or more per acre each year at culmination of mean annual growth when fully stocked with desirable trees. Of this, about 5.3 million acres are capable of growing 85 cubic feet or more annually. Currently, net growth of growing stock across all ownerships and site classes averages about 48 cubic feet per acre. If area of commercial forest land is not increased, an average net growth of 79 cubic feet per acre would be required to sustain the potential available cut estimated earlier in this report. There are numerous opportunities available for narrowing this gap between attained and potential growth.

STAND IMPROVEMENT

Extensive stand improvement efforts could greatly increase growth. Only about 1.6 million acres are 70 percent or more stocked with desirable trees (Condition Class 1). Another 7.5 million acres are between 40 and 70 percent stocked with desirable trees, but only about 13 percent of this area is expected to attain full stocking without treatment. The remaining 6.5 million acres require treatment to free the desirable trees from competition and overtopping.

REGENERATION

About 1.6 million acres in North Carolina have low or no growth potential in their present condition. This land is less than 40 percent stocked with growing stock (Condition Class 6). Regeneration efforts will be required to bring these acres into production, and site preparation will be needed to remove shrubs and low-quality trees from more than 40 percent of this area prior to planting or reseeding.

Under present conditions, growth is well below potential on another 9.4 million acres which are fair to well stocked with growing stock, but less than 40 percent stocked with desirable trees (Condition Classes 4 and 5). Under these conditions, the management opportunities are not as well defined as they are for the other condition classes. However, many of these stands can be included among those requiring site preparation and planting.

PROTECTION

The reduction of timber losses caused by fire, insects, disease, and other natural destructive agents represents another important means of increasing future timber supplies. The mortality of growing stock from all causes in 1963 amounted to almost one-fourth the volume of growing stock cut for all purposes. In addition, an undetermined volume of growth was lost as the result of damage to trees that were not actually killed. Many of these same destructive agents cause defects that reduce the grade and value of standing timber.

UTILIZATION

There are also opportunities for additional improvement in the utilization of available wood supplies in North Carolina. Logging and plant residues combined total over 200 million cubic feet annually. Although full economic use of the entire volume of woods and plant residues is not feasible today, further progress toward better utilization is possible. The limited uses that are available for over 1.4 billion cubic feet of rough trees in the standing-tree inventory, however, dwarf most of the other utilization problems.

CONDITIONS IN GENERAL

This third Statewide inventory of North Carolina's timber resource found forest conditions generally improved. In most areas, the level of net growth has been high enough to support forest industry's timber needs and at the same time contribute to a buildup in the inventory of growing stock. Regeneration and protection have resulted in the establishment of young trees in great number.

Nevertheless, the timber resource in North Carolina presents a wide range of opportunities for improving its future use through intensified management efforts. Not only can timber supplies be replenished, but species composition and timber quality can be controlled to some extent by the forest managers. The economic potential of these opportunities in North Carolina today provides a strong incentive for improving timber productivity.

This poorly stocked stand emphasizes the fact that present growth is far below potential in North Carolina.

Appendix

ACCURACY OF THE SURVEY

The data on forest acreage and timber volume in this report include estimates based on samples having an associated sampling error. A large enough sample is taken to keep the sampling error below a specified minimum for forest area and timber volume. Nonsampling errors, such as may arise from mistakes in judgment, measurement, recording, and compilation, are kept to a minimum through training, supervision, field check cruises, and complete editing and machine verification in compiling the data.

Estimates of forest area were based on the classification of 209,174 sample points systematically spaced on aerial photographs with a ground check of 9,395 of these points to adjust for changes in land use since date of photography. Estimates of volume and growth are based on measurements recorded at 6,474 of the ground check points classed as forest land. Estimates of timber products output are based primarily on data collected for the southern pulpwood production report, a special canvass to determine veneer-log production in 1963, and commodity drain surveys made by the State for 1962 and 1964.

Statistical analysis of the data indicates a sampling error of ±0.3 percent for the estimate of total forest area, 1.1 percent for total cubic volume, and 1.7 percent for total cubic-volume growth. As these totals are broken down by forest type, species, tree diameter, and other subdivisions, the possibility of error increases. The order of this increase is suggested in the following tabulation, which shows the sampling error to which the estimates are liable, two chances out of three.

Forest area	Sampling error [1]	Cubic volume	Sampling error [1]	Net cu. ft. growth	Sampling error [1]
Thousand acres	*Percent*	*Million cu. ft.*	*Percent*	*Million cu. ft.*	*Percent*
20,448.1	0.3				
1,840.3	1.0	18,464.7	1.1	812.1	1.7
460.1	2.0	5,585.6	2.0	586.7	2.0
204.5	3.0	2,482.5	3.0	260.8	3.0
115.0	4.0	1,396.4	4.0	146.7	4.0
73.6	5.0	893.7	5.0	93.9	5.0
18.4	10.0	223.4	10.0	23.5	10.0
8.2	15.0	99.3	15.0	10.4	15.0
4.6	20.0	55.9	20.0	5.9	20.0
2.9	25.0	35.7	25.0	3.8	25.0

[1] By random-sampling formula.

HOW THE FOREST INVENTORY IS MADE

These latest forest statistics for North Carolina were obtained by aerial photo interpretation with ground checks, remeasurement of plots established in the previous survey, and measurements taken at new sample locations. The basic steps of the procedure were as follows:

1. From the most recent aerial photography available, every third photo was obtained in alternate flight lines most nearly coinciding with those used in the previous survey. Extra photos were obtained for forest sample plots drawn for remeasurement when they fell between the selected photos or off the flight line. Preliminary estimates of the acreage of forest land and other land-use classes were obtained by classifying grid points printed on the flight-line photos. A grid was not printed on the extra photos. The proportion of grid points falling in each land-use class provided the initial acreage estimates.

2. Each land-use class was sampled proportionally on the ground. Plots in nonforest land were systematically chosen to verify and adjust the area estimates based on the photo grid points. When available, enough old forest plots to meet established limits of error per billion cubic feet of timber were relocated on the new photos. In counties with more established plots than were needed, the extra plots were deleted at random. If there were not enough established plots, additional plots were added using the grid points. The first added plot was chosen at random and subsequent plots selected at systematic intervals from the first. The photos, both old and new, and the old plot tally sheets were then sent to the field crews.

In the Coastal Plain, the basic plot measured at both new and relocated sample areas was a variable plot with a basal area factor of 10 square feet per acre. Timber volume, quality, and growth were tallied on this basic plot. Area description information was collected on 20 sample points systematically established within the circular acre around plot center. At each of these 20 points, stocking of trees 5.0 inches d.b.h. and larger was tallied on a variable plot with a basal area factor of 75 square

feet per acre. Stocking of smaller trees and brush was recorded on concentric fixed-radius plots around the point centers.

In the Piedmont and Mountains, a 10-point cluster of plots systematically spaced on the acre was measured at each sample location. At each of these points a variable plot was tallied using a basal area factor of 37.5 square feet per acre. Trees less than 3.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

3. Throughout the State on relocated plots, all trees tallied as 3.0 inches d.b.h. and larger in the previous survey were accounted for. Missing trees were recorded as either cut or dead. At each new sample location, the stumps of trees cut within the past 3 years were measured on a 1/5-acre plot to determine timber cut. At these same sample locations, the 1/5-acre plot used to measure timber cut was also used to measure mortality. Trees deadened in stand improvement practices were included with cut. Data from special utilization and commodity drain studies were used to break down volume of timber cut by product.

4. Growth estimates were based on increment borings taken on all trees 4.0 inches d.b.h. and larger tallied on the basic plots established in the Coastal Plain. In the Piedmont and Mountains, growth estimates were based largely on diameter remeasurements of old sample trees recorded in the previous survey.

5. Local volume equations were prepared from data collected on a 10-percent subsample of the sample locations established in the Piedmont and Mountains. On these volume plots, marked aluminum poles were extended up each tree tallied 5.0 inches d.b.h. and larger to measure section lengths and height. A mirror-caliper was designed and used to measure diameters up the trees. Additional measurements were taken to determine cull and bark thickness.

6. Ownership information was collected from local contacts, correspondence, and public records. Preliminary public ownership information was collected by the photo interpreter prior to sending the photos to the field.

7. All field data collected were sent to Asheville for editing and were punched in cards for machine computing, sorting, and tabulating. Final estimates were based on statistical summaries of the data.

DEFINITIONS OF TERMS

Land Use Classes

Forest land.—Land at least 10 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use.

Commercial forest land.—Forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Includes areas suitable for management to grow crops of industrial wood generally capable of producing in excess of 20 cubic feet per acre of annual growth. Includes both accessible and inaccessible areas.

Noncommercial forest land.—Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions and productive forest land withdrawn from commercial timber use through statute or administrative regulation.

Productive-reserved forest land.—Productive public forest land withdrawn from timber utilization through statute or administrative regulation.

Unproductive forest land.—Forest land incapable of yielding crops of industrial wood because of adverse site conditions. Includes sterile or poorly drained forest land and steep rocky areas where topographic conditions are likely to prevent management for timber production.

Nonforest land.—Land that has never supported forests and lands formerly forested where use of timber is precluded by development for nonforest uses, such as crops, improved pasture, residential areas, and city parks. Also includes improved roads and adjoining rights-of-way, powerline clearings, and certain areas of water classified by the Bureau of the Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forest areas must be more than one acre in size, to qualify as nonforest land.

Ownership Classes

National Forest.—Federal lands which have been designated by Executive order or statute as National Forests or purchase units, and other lands under the administration of the Forest Service.

Other Federal.—Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and miscellaneous Federal agencies.

State.—Lands owned by States, or lands leased by States for more than 50 years.

County and municipal.—Lands owned by counties or municipalities, or lands leased by these governmental units for more than 50 years.

Forest industry.—Lands owned by companies or individuals operating wood-using plants.

Farmer-owned.—Lands owned by operators of farms. (A farm is defined as a place operated as a unit of 10 or more acres from which the sale of agricultural products totaled $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products totaled $250 or more annually during the previous year.)

Miscellaneous private.—Privately owned lands

other than forest-industry or farmer-owned.

Stand-Size Classes

Sawtimber stands.—Stands at least 10 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands at least 10 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees, and with poletimber stocking exceeding that of sawtimber stocking.

Sapling-seedling stands.—Stands at least 10 percent stocked with growing-stock trees with more than half of this stocking in saplings or seedlings.

Nonstocked areas.—Commercial forest lands less than 10 percent stocked with growing-stock trees.

Stocking

A measure of area occupancy by trees of specified classes. Three categories of stocking are considered in the Survey: (1) all live trees, (2) growing-stock trees, and (3) desirable trees. Stocking in terms of all trees is used in the delineation of forest land and forest types. Stocking in terms of growing-stock trees is used in stand-size and age classifications. Stocking in terms of desirable trees is used in delineating area condition classes.

Forest Type Groups

White-red-jack pine.—Forests in which 50 percent or more of the stand is eastern white pine, red pine, or jack pine, singly or in combination. (Common associates include hemlock, aspen, birch, and maple.)

Spruce-fir.—Forests in which 50 percent or more of the stand is spruce or true firs, singly or in combination. (Common associates include white-cedar, tamarack, maple, birch, and hemlock.)

Longleaf-slash pine.—Forests in which 50 percent or more of the stand is longleaf or slash pine, singly or in combination. (Common associates include other southern pines, oak, and gum.)

Loblolly-shortleaf pine.—Forests in which 50 percent or more of the stand is loblolly pine, shortleaf pine, or other southern yellow pines except longleaf or slash pine, singly or in combination. (Common associates include oak, hickory, and gum.)

Oak-pine.—Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern pines make up 25-49 percent of the stand. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.—Forests in which 50 percent or more of the stand is upland oaks or hickory, singly or in combination, except where pines comprise 25-49 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress.—Bottom-land forests in which 50 percent or more of the stand is tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, except where pines comprise 25-49 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood.—Forests in which 50 percent or more of the stand is elm, ash, or cottonwood, singly or in combination. (Common associates include willow, sycamore, beech, and maple.)

Maple-beech-birch.—Forests in which 50 percent or more of the stand is maple, beech, or yellow birch, singly or in combination. (Common associates include hemlock, elm, basswood, and white pine.)

Tree Species

Commercial species.—Tree species presently or prospectively suitable for industrial wood products; excludes so-called weed species, such as blackjack oak and hawthorn.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous. Soft-textured hardwoods include boxelder, red and silver maple, buckeye, hackberry, loblolly-bay, silverbell (in Mts.), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm. Hard-textured hardwoods include Florida and sugar maple, birch, hickory, dogwood, persimmon (forest-grown), beech, ash, honeylocust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Site Quality Classes

Site classes represent a classification of forest land in terms of inherent capacity to grow crops of industrial wood.

Site classifications are based upon the mean annual growth of growing stock (not including thinnings) attainable in fully stocked stands at culmination of mean annual growth. Height-age relationships are used as indicators of the specified volume-site classes. Four site-quality classes are recognized:

Class 1.—Sites capable of producing 120 or more cubic feet per acre annually.

Class 2.—Sites capable of producing 85 to 120 cubic feet per acre annually.

Class 3.—Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 4.—Sites capable of producing less than 50 cubic feet per acre annually, but excluding unproductive sites.

Area Condition Classes

Area condition classes represent a classification of commercial forest land based upon stocking by desirable trees and other conditions affecting current and prospective timber growth.

Class 1.—Areas 70 percent or more stocked with desirable trees.

Class 2.—Areas 40 to 70 percent stocked with desirable trees and with less than 30 percent of the area controlled by acceptable growing-stock trees, cull trees, inhibiting vegetation, slash, or nonstockable conditions.

Class 3.—Areas 40 to 70 percent stocked with desirable trees and with 30 percent or more of the area controlled by other trees or conditions that ordinarily prevent occupancy by desirable trees.

Class 4.—Areas less than 40 percent stocked with desirable trees, but with 70 percent or more stocking with growing-stock trees.

Class 5.—Areas less than 40 percent stocked with desirable trees, but with 40 to 70 percent stocking with growing-stock trees.

Class 6.—Areas less than 40 percent stocked with desirable trees and with less than 40 percent stocking with growing-stock trees.

Class of Timber

Growing-stock trees.—Sawtimber trees, poletimber trees, saplings, and seedlings; that is, all live trees except cull trees.

Sawtimber trees.—Live trees of commercial species 9.0 inches and larger in diameter at breast height for softwoods and 11.0 inches and larger in diameter at breast height for hardwoods, and containing at least one saw log.

Poletimber trees.—Live trees of commercial species at least 5.0 inches in diameter at breast height but smaller than sawtimber size, and of good form and vigor.

Saplings.—Live trees of commercial species 1.0 to 5.0 inches in diameter at breast height and of good form and vigor.

Seedlings.—Live trees of commercial species less than 1.0 inch in diameter at breast height that are expected to survive, according to regional standards.

Desirable trees.—Growing-stock trees having no serious defects in quality that limit present or prospective use; of relatively high vigor and containing no pathogens that may result in death or serious deterioration before rotation age. They include the type of trees forest managers aim to grow, that is, the trees left in silvicultural cutting or favored in cultural operations.

Acceptable trees.—Trees meeting the specifications for growing stock but not qualifying as desirable trees.

Rough trees (sound cull trees).—Live trees that do not contain a saw log now or prospectively, primarily because of roughness, poor form, or noncommercial species.

Rotten cull trees.—Live trees that do not contain a saw log now or prospectively, primarily because of rot.

Salvable dead trees.—Standing or down dead trees that are considered currently or potentially merchantable.

Log Grades

A classification of logs based on external characteristics as indicators of quality or value.

White pine quality classes are based on the revised trial specifications for white pine log grades prepared by the Northeastern Forest Experiment Station in 1960. Other softwood quality classes are based on standards presented by the U. S. Forest Service in "Interim Log Grades for Southern Pines," issued by the Southern Forest Experiment Station in 1953.

Hardwood quality classes are based on "Hardwood Log Grades for Standard Lumber," issued by the Forest Products Laboratory under the designation D1737 in 1949. Hardwood log grades include, in addition to the log grades for standard lumber, a grade 4 tie and timber log. A grade 4 hardwood log must be sound internally, and no single knot or group of knots within a 6-inch section of the log can exceed one-third the log diameter at that point. Rotten defects or holes can be present on the surface of the log, but they must not extend more than 3 inches into the potential tie or timber. Sweep departure cannot exceed one-fourth the log scaling diameter per 8 feet of length.

Diameters

D.b.h. (diameter at breast height).—Tree diameter in inches, outside bark, measured at 4½ feet above ground.

Diameter classes.—The 2-inch diameter classes extend from 1.0 inch below to 0.9 inch above the stated midpoint. For example, the 6-inch class contains trees 5.0-6.9 inches d.b.h., inclusive.

Volume

Volume of sawtimber.—Net volume of the saw-log portion of live sawtimber trees in board feet, International ¼-inch rule.

Volume of growing stock.—Volume of sound wood in the bole of sawtimber and poletimber trees from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

Volume of timber.—The volume of sound wood in the bole of growing stock, cull, and salvable dead trees 5.0 inches and larger in diameter at breast height, from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

Standard cord.—A stacked pile of round or split bolts of wood, including bark, encompassing 128 cubic feet. See "Conversion Factors" for cubic-foot content of solid wood per average cord.

Growth and Timber Cut

Gross growth.—Net annual growth plus annual mortality.

Net annual growth of growing stock.—The annual change in volume of sound wood in live sawtimber and poletimber trees resulting from natural causes.

Net annual growth of sawtimber.—The annual change in net board-foot volume of live sawtimber trees resulting from natural causes.

Mortality of growing stock.—The volume of sound wood in live sawtimber and poletimber trees dying annually from natural causes.

Mortality of sawtimber.—The net board-foot volume of sawtimber trees dying annually from natural causes.

Timber cut from growing stock.—The volume of sound wood in live sawtimber and poletimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber cut from sawtimber.—The net board-foot volume of live sawtimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber products.—Roundwood products and by-products of wood manufacturing plants.

Conversion Factors

Cubic feet of wood per average cord
(Excluding bark)

D.b.h.	Pine	Other softwoods	Hardwood
6	61.2	64.6	59.6
8	68.1	72.9	68.2
10	72.9	78.1	73.1
12	76.4	82.1	76.4
14	79.3	84.7	78.4
16	81.5	87.2	79.8
18	83.0	89.3	80.9
20	84.6	90.8	81.4
22	85.5	92.3	82.0
24	87.2	92.6	82.5
26+	89.2	95.6	83.4
Average	73.7	82.6	74.5

$$\text{Rough cords per M cubic feet (without bark)} = a + b\left(\frac{1}{\text{D.b.h.}}\right) + c\left(\frac{1}{\text{D.b.h.}}\right)^2$$

where	Pine	Other softwoods	Hardwood
a=	10.01850	9.15960	11.68410
b=	34.42135	28.75793	3.74431
c=	22.73994	25.54418	157.39417

INDEX TO DETAILED TABLES

Area

1. Area by land classes
2. Area of commercial forest land, by ownership classes
3. Area of commercial forest land, by stand-size and ownership classes
4. Area of commercial forest land, by stand-volume classes for sawtimber and other stand-size classes
5. Area of commercial forest land, by stocking classes based on alternative stand components
6. Area of commercial forest land, by stocking classes of growing-stock trees and by stand-size classes
7. Area of commercial forest land, by area-condition and ownership classes
8. Area of commercial forest land, by area-condition and stocking classes
9. Area of commercial forest land, by site and ownership classes
10. Area of commercial forest land, by forest types and ownership classes
11. Area of noncommercial forest land, by forest types

Volume

12. Number of growing-stock trees on commercial forest land, by diameter classes and by softwood and hardwood
13. Number of cull and salvable dead trees on commercial forest land, by diameter groups and by softwood and hardwood
14. Volume of timber on commercial forest land, by class and by softwood and hardwood
15. Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
16. Volume of growing stock and sawtimber on commercial forest land, by stand-size classes and by softwood and hardwood
17. Volume of growing stock on commercial forest land, by species and diameter classes
18. Volume of sawtimber on commercial forest land, by species and diameter classes
19. Volume of sawtimber on commercial forest land, by species and log grade
20. Volume of salvable dead sawtimber-size trees on commercial forest land, by softwood and hardwood

Growth, Cut, and Mortality

21. Net annual growth and annual cut of growing stock on commercial forest land, by species
22. Net annual growth and cut of growing stock on commercial forest land, by ownership classes and by softwood and hardwood
23. Net annual growth and cut of sawtimber on commercial forest land, by species
24. Net annual growth and cut of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
25. Annual mortality of growing stock and sawtimber on commercial forest land, by species
26. Annual mortality of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
27. Annual mortality of growing stock and sawtimber on commercial forest land, by causes and by softwood and hardwood

Utilization

28. Total output of timber products, by product, by type of material used, and by softwood and hardwood
29. Total output of roundwood products, by source and by softwood and hardwood
30. Annual timber cut from growing stock on commercial forest land, by product and logging residues, and by softwood and hardwood
31. Annual timber cut from live sawtimber on commercial forest land, by product and logging residues, and by softwood and hardwood
32. Volume of plant residues by industrial source and type of residue, and by softwood and hardwood

Projections

33. Timber growth projections

Supplemental Tables

34. Volume of timber, by species group and timber quality
35. Basal area per acre of growing-stock and cull trees 5.0 inches d.b.h. and larger, by forest type and Survey Unit
36. Number of growing-stock and cull trees 1.0-4.9 inches d.b.h. per acre, by forest type and Survey Unit
37. Average net volume per acre on commercial forest land, by area description and species group
38. Average net volume and growth per acre on commercial forest land, by ownership, tree class, and species group
39. Land area, by class and major forest type, 1938, 1955, and 1964
40. Volume of sawtimber, growing stock, and all timber, by species group and diameter class, 1938, 1955, and 1964.
41. Volume of all timber by species group, Survey Unit, 1938, 1955, and 1964.

County Tables

42. Land area and commercial forest, by county
43. Commercial forest land, by county and ownership
44. Volume of sawtimber and growing stock, by county and species group
45. Annual cut of growing stock and sawtimber, by county
46. Net annual growth of growing stock and sawtimber, by county

Table 1. *Area by land classes, North Carolina, 1964*

Land class	Area
	Thousand acres
Commercial forest land	20,027.3
Unproductive forest land	48.8
Productive-reserved forest land	372.0
Total forest land	20,448.1
Nonforest land [1]	10,919.2
All land [2]	31,367.3

[1] Includes 163,600 acres of water according to survey standards of area classification but defined by Bureau of the Census as land, and excludes 37,300 acres of Census water created since 1960.
[2] From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

Table 2. *Area of commercial forest land, by ownership classes, North Carolina, 1964*

Ownership class	Area
	Thousand acres
National Forest	1,055.7
Other Federal:	
Bureau of Land Management	.
Indian	56.8
Miscellaneous Federal	257.3
Total other Federal	314.1
State	307.4
County and municipal	65.8
Forest industry:	
Pulp and paper	1,831.8
Lumber	500.2
Other	163.2
Total forest industry	2,495.2
Farmer-owned	9,315.5
Farmer, leased [1]	7.4
Miscellaneous private	6,373.3
Miscellaneous private, leased [1]	92.9
All ownerships	20,027.3

[1] Leased to wood-using industry.

Table 3. *Area of commercial forest land, by stand-size and ownership classes, North Carolina, 1964*

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
Sawtimber	10,486.0	757.9	413.3	1,185.7	8,129.1
Poletimber	4,224.4	189.9	122.2	491.3	3,421.0
Sapling and seedling	5,132.4	104.7	138.0	779.0	4,110.7
Nonstocked areas	184.5	3.2	13.8	39.2	128.3
All classes	20,027.3	1,055.7	687.3	2,495.2	15,789.1

Table 4. *Area of commercial forest land, by stand-volume classes for sawtimber and other stand-size classes, North Carolina, 1964*

Stand volumes per acre	All stands	Sawtimber stands	Other stands
	Thousand acres		
Less than 1,500 board feet	7,463.8	1,313.3	6,150.5
1,500 to 5,000 board feet	5,228.8	2,820.0	2,408.8
More than 5,000 board feet	7,334.7	6,352.7	982.0
All classes	20,027.3	10,486.0	9,541.3

Table 5. *Area of commercial forest land, by stocking classes based on alternative stand components, North Carolina, 1964*

Stocking percentage	Stocking classified in terms of —		
	All trees	Growing-stock trees	Desirable trees
	Thousand acres		
90 — 100	10,329.3	4,250.0	183.4
80 — 90	4,110.9	4,494.1	468.9
70 — 80	2,451.6	4,114.1	900.5
60 — 70	1,267.9	2,945.2	1,754.4
50 — 60	738.0	1,635.8	2,574.6
40 — 50	478.7	1,004.3	3,200.4
30 — 40	266.8	704.8	3,644.2
20 — 30	169.0	404.3	3,237.1
10 — 20	124.9	290.2	2,397.4
Less than 10	90.2	184.5	1,666.4
All areas	20,027.3	20,027.3	20,027.3

Table 6. *Area of commercial forest land, by stocking classes of growing-stock trees and by stand-size classes, North Carolina, 1964*

Stocking class	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Non-stocked areas
	Thousand acres				
70 percent or more	12,858.2	7,374.6	2,648.7	2,834.9	
40 to 70 percent	5,585.3	2,665.5	1,264.3	1,655.5	.
10 to 40 percent	1,399.3	445.9	311.4	642.0	.
Less than 10 percent	184.5	.	.	.	184.5
All classes	20,027.3	10,486.0	4,224.4	5,132.4	184.5

Table 7. *Area of commercial forest land, by area-condition and ownership classes, North Carolina, 1964*

Area-condition class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
1	1,552.8	44.3	39.9	321.5	1,147.1
2	1,003.6	12.3	43.0	153.8	794.5
3	6,525.8	302.7	169.3	753.5	5,300.3
4	5,195.0	364.5	156.2	645.3	4,029.0
5	4,166.2	273.6	136.2	424.8	3,331.6
6	1,583.9	58.3	142.7	196.3	1,186.6
All classes	20,027.3	1,055.7	687.3	2,495.2	15,789.1

Table 8. *Area of commercial forest land, by area-condition and stocking classes, North Carolina, 1964*

Area-condition class	All classes		Stocking class									
			Growing stock				Cull trees		Shrubs		Nonstocked	
			Desirable		Other							
	Thousand acres	*Percent*	*Thousand acres*	*Percent*	*Thousand acres*	*Percent*	*Thousand acres*	*Percent*	*Thousand acres*	*Percent*	*Thousand acres*	*Percent*
1	1,552.8	100.0	1,182.6	76.1	167.6	10.8	55.7	3.6	18.4	1.2	128.5	8.3
2	1,003.6	100.0	542.4	54.0	136.0	13.6	32.9	3.3	11.0	1.1	281.3	28.0
3	6,525.8	100.0	3,177.9	48.7	1,964.2	30.1	643.5	9.9	165.3	2.5	574.9	8.8
4	5,195.0	100.0	1,180.0	22.7	2,931.6	56.4	508.0	9.8	94.6	1.8	480.8	9.3
5	4,166.2	100.0	783.6	18.8	1,469.7	35.3	870.2	20.9	275.6	6.6	767.1	18.4
6	1,583.9	100.0	157.7	10.0	185.1	11.7	399.9	25.2	258.2	16.3	583.0	36.8
All classes	20,027.3	100.0	7,024.2	35.1	6,854.2	34.2	2,510.2	12.5	823.1	4.1	2,815.6	14.1

Table 9. *Area of commercial forest land, by site and ownership classes, North Carolina, 1964*

Site class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
120 cu. ft. or more	1,147.2	59.6	29.6	104.6	953.4
85 to 120 cu. ft.	4,171.8	147.7	98.4	584.2	3,341.5
50 to 85 cu. ft.	9,852.8	512.2	285.0	1,142.5	7,913.1
Less than 50 cu. ft.	4,855.5	336.2	274.3	663.9	3,581.1
All classes	20,027.3	1,055.7	687.3	2,495.2	15,789.1

Table 10. *Area of commercial forest land, by forest types and ownership classes, North Carolina, 1964*

Type	All ownerships	Public	Private
	Thousand acres		
Softwood types:			
White pine-hemlock	140.2	26.8	113.4
Spruce-fir	14.7	6.3	8.4
Longleaf pine	462.1	102.5	359.6
Slash pine	32.5	.	32.5
Loblolly pine	3,121.3	111.7	3,009.6
Shortleaf pine	1,079.7	42.6	1,037.1
Virginia pine	789.1	8.9	780.2
Eastern redcedar	28.2	.	28.2
Pond pine	1,408.6	227.6	1,181.0
Pitch pine	45.9	13.0	32.9
Table-Mountain pine	18.9	14.7	4.2
Total	7,141.2	554.1	6,587.1
Hardwood types:			
Oak-pine	3,556.6	230.2	3,326.4
Oak-hickory:			
Chestnut oak	275.8	92.1	183.7
Scrub oak	198.9	25.2	173.7
Other	5,541.2	668.4	4,872.8
Oak-gum-cypress	2,680.9	84.9	2,596.0
Elm-ash-cottonwood	324.6	2.6	322.0
Maple-beech-birch	308.1	85.5	222.6
Total	12,886.1	1,188.9	11,697.2
All types	20,027.3	1,743.0	18,284.3

Table 11. *Area of noncommercial forest land, by forest types, North Carolina, 1964*

Type	All areas	Productive-reserved areas	Unproductive areas
	Thousand acres		
White-red-jack pine	3.8	3.8	.
Spruce-fir	5.5	4.5	1.0
Loblolly-shortleaf pine	49.4	20.0	29.4
Oak-pine	11.6	10.5	1.1
Oak-hickory	341.3	332.8	8.5
Oak-gum-cypress	9.2	0.4	8.8
All types	420.8	372.0	48.8

Table 12. *Number of growing-stock trees on commercial forest land, by diameter classes and by softwood and hardwood, North Carolina, 1964*

D.b.h. class (inches)	All species	Softwood	Hardwood
	Thousand trees		
1.0-2.9	6,519,875	1,621,255	4,898,620
3.0-4.9	1,976,601	775,833	1,200,768
5.0-6.9	924,997	434,947	490,050
7.0-8.9	533,553	257,077	276,476
9.0-10.9	307,380	144,076	163,304
11.0-12.9	177,904	82,555	95,349
13.0-14.9	102,388	41,949	60,439
15.0-16.9	55,364	20,152	35,212
17.0-18.9	28,939	9,479	19,460
19.0-28.9	27,001	6,838	20,163
29.0-38.9	1,160	182	978
39.0 and larger	125	15	110
All classes	10,655,287	3,394,358	7,260,929

Table 13. *Number of cull and salvable dead trees on commercial forest land, by diameter groups and by softwood and hardwood, North Carolina, 1964*

D.b.h. class (inches)	Cull trees	Salvable dead trees
	Thousand trees	
Softwood:		
5.0-8.9	22,446	997
9.0-18.9	11,483	224
19.0 and larger	299	11
Total	34,228	1,232
Hardwood:		
5.0-10.9	285,828	750
11.0-18.9	45,759	151
19.0 and larger	7,171	33
Total	338,758	934
All species	372,986	2,166

Table 14. *Volume of timber on commercial forest land, by class and by softwood and hardwood, North Carolina, 1964*

Class of timber	All species	Softwood	Hardwood
	– – – Million cubic feet – – –		
Sawtimber trees:			
Saw-log portion	9,916.9	4,925.6	4,991.3
Upper-stem portion	2,397.4	912.5	1,484.9
Total	12,314.3	5,838.1	6,476.2
Poletimber trees	6,150.4	2,175.3	3,975.1
All growing-stock trees	18,464.7	8,013.4	10,451.3
Rough trees:			
Sawtimber-size trees	698.4	119.4	579.0
Poletimber-size trees	715.2	48.1	667.1
Total	1,413.6	167.5	1,246.1
Rotten cull trees:			
Sawtimber-size trees	745.1	37.2	707.9
Poletimber-size trees	202.4	7.7	194.7
Total	947.5	44.9	902.6
Salvable dead trees:			
Sawtimber-size trees	12.0	4.9	7.1
Poletimber-size trees	7.2	3.7	3.5
Total	19.2	8.6	10.6
Total, all timber	20,845.0	8,234.4	12,610.6

Table 15. *Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, North Carolina, 1964*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	– – – Million cubic feet – – –			*– – – Million board feet – – – –*		
National Forest	1,197.0	298.6	898.4	3,668.2	995.2	2,673.0
Other public	521.6	284.3	237.3	1,632.0	904.9	727.1
Forest industry	2,192.3	1,112.6	1,079.7	6,941.6	4,071.6	2,870.0
Farmer and misc. private	14,553.8	6,317.9	8,235.9	42,091.6	20,271.8	21,819.8
All ownerships	18,464.7	8,013.4	10,451.3	54,333.4	26,243.5	28,089.9

Table 16. *Volume of growing stock and sawtimber on commercial forest land, by stand-size classes and by softwood and hardwood, North Carolina, 1964*

Stand-size class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	– – – – Million cubic feet – – –			*– – – – Million board feet – – – –*		
Sawtimber	14,307.6	6,062.0	8,245.6	47,902.9	22,983.5	24,919.4
Poletimber	3,074.5	1,353.3	1,721.2	4,200.1	1,965.6	2,234.5
Sapling and seedling	1,080.9	596.9	484.0	2,226.2	1,292.1	934.1
Nonstocked areas	1.7	1.2	0.5	4.2	2.3	1.9
All classes	18,464.7	8,013.4	10,451.3	54,333.4	26,243.5	28,089.9

Table 17. *Volume of growing stock on commercial forest land, by species and diameter classes, North Carolina, 1964*

Species	Diameter class (inches at breast height)										
	All classes	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-28.9	29.0-38.9	39.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	344.1	48.7	95.6	74.6	65.0	34.4	17.9	5.4	2.5	.	
Shortleaf pine	1,380.9	218.9	327.7	336.3	248.9	138.1	62.7	26.5	21.0	0.8	.
Loblolly pine	4,091.5	278.3	497.6	692.9	763.0	685.0	496.9	329.4	336.1	11.4	0.9
Pond pine	808.8	94.0	153.1	183.1	166.3	97.3	68.7	28.6	17.7		.
Virginia pine	558.3	140.3	161.8	127.4	72.5	33.7	14.4	6.7	1.5		.
Pitch pine	112.4	11.6	24.1	22.2	23.3	13.5	8.9	4.6	4.2	.	
Table-Mountain pine	17.5	2.1	2.6	3.2	2.6	3.0	1.8	1.5	0.7	.	
Eastern white pine	237.0	18.6	26.1	31.8	37.7	31.4	23.2	14.7	47.7	5.8	
Spruce and balsam fir	7.2	0.6	1.6	1.5	1.4	0.7	0.2	0.3	0.9	.	.
Eastern hemlock	106.0	6.2	6.8	9.3	11.9	9.7	11.2	7.3	28.5	12.7	2.4
Cypress	271.9	4.0	15.1	26.7	38.9	50.3	33.7	36.2	59.7	5.6	1.7
Other eastern softwoods	77.8	24.2	15.7	19.5	10.8	4.7	1.3	0.9	0.7		
Total	8,013.4	847.5	1,327.8	1,528.5	1,442.3	1,101.8	740.9	462.1	521.2	36.3	5.0
Hardwood:											
Select white oaks [1]	1,069.0	79.5	130.5	172.7	180.4	151.8	120.6	73.3	136.2	20.3	3.7
Select red oaks [2]	485.2	34.0	47.3	59.9	49.5	53.5	63.6	48.2	104.8	22.0	2.4
Other white oaks	803.5	72.2	111.6	140.1	110.9	86.2	65.3	66.4	132.2	14.7	3.9
Other red oaks	1,398.4	132.2	189.5	205.1	198.3	189.3	147.6	99.9	206.6	22.6	7.3
Hickory	609.3	52.5	71.0	83.9	101.4	97.3	74.6	44.0	73.1	7.6	3.9
Yellow birch	30.0	3.6	3.2	2.6	1.7	3.2	5.1	3.0	7.0	0.6	
Hard maple	54.4	4.9	8.1	7.9	8.4	5.7	5.9	4.1	7.4	2.0	
Soft maple	810.5	113.5	143.2	138.4	108.3	101.7	58.9	61.9	80.8	3.8	
Beech	134.1	7.7	11.2	17.6	19.7	19.7	16.4	10.6	27.8	3.4	.
Sweetgum	1,246.2	120.7	157.1	229.7	204.0	174.8	140.3	99.1	110.5	9.1	0.9
Tupelo and blackgum	1,649.1	93.1	171.2	248.5	270.8	236.1	218.6	162.4	221.1	22.2	5.1
Ash	242.8	21.5	36.3	45.8	39.8	26.6	25.7	19.4	22.3	3.0	2.4
Cottonwood	6.7	0.2	1.9	1.3		0.8	1.6		0.9		.
Basswood	67.1	4.1	9.2	11.5	7.9	10.7	9.5	7.0	7.2		
Yellow-poplar	1,123.0	103.4	146.6	193.6	175.2	168.5	125.4	85.3	116.2	6.0	2.8
Black cherry	28.7	6.9	7.8	4.5	2.5	4.1	0.9	1.3	0.7		.
Black walnut	25.7	3.8	2.4	5.6	4.7	2.5	0.8	2.6	2.2	1.1	
Other eastern hardwoods	667.6	89.3	96.3	118.9	85.8	82.9	55.8	49.2	75.4	11.1	2.9
Total	10,451.3	943.1	1,344.4	1,687.6	1,569.3	1,415.4	1,136.6	837.7	1,332.4	149.5	35.3
All species	18,464.7	1,790.6	2,672.2	3,216.1	3,011.6	2,517.2	1,877.5	1,299.8	1,853.6	185.8	40.3

[1] Includes *Quercus alba, Q. macrocarpa, Q. michauxii,* and *Q. bicolor.*
[2] Includes *Q. rubra, Q. falcata* var. *pagodaefolia,* and *Q. shumardii.*

Table 18. *Volume of sawtimber on commercial forest land, by species and diameter classes, North Carolina, 1964*

Species	Diameter class (inches at breast height)								
	All classes	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-28.9	29.0-38.9	39.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	919.6	313.7	305.4	172.4	88.9	27.5	11.7	.	.
Shortleaf pine	3,309.1	1,082.5	1,079.3	644.6	295.8	120.2	84.3	2.4	.
Loblolly pine	15,561.2	2,362.0	3,389.9	3,421.6	2,637.5	1,802.6	1,883.5	58.8	5.3
Pond pine	2,361.1	642.5	687.8	452.9	342.7	142.0	93.2	.	.
Virginia pine	977.0	461.0	289.5	136.7	58.6	25.6	5.6	.	.
Pitch pine	309.6	78.6	100.1	60.9	37.1	18.2	14.7		.
Table-Mountain pine	53.9	12.1	12.0	13.8	7.5	6.1	2.4	.	.
Eastern white pine	892.9	122.2	167.4	148.6	113.1	73.4	239.9	28.3	.
Spruce and balsam fir	39.0	8.7	10.3	6.3	2.3	2.6	8.8	.	.
Eastern hemlock	407.7	34.9	51.3	43.9	51.9	34.3	129.4	53.1	8.9
Cypress	1,198.9	76.3	148.7	228.4	175.0	193.7	335.9	32.4	8.5
Other eastern softwoods	213.5	106.3	62.5	27.4	8.1	5.1	4.1	.	.
Total	26,243.5	5,300.8	6,304.2	5,357.5	3,818.5	2,451.3	2,813.5	175.0	22.7
Hardwood:									
Select white oaks [1]	3,014.3		683.6	649.3	564.1	354.0	660.6	90.0	12.7
Select red oaks [2]	1,537.0		151.8	218.4	294.6	237.4	525.5	99.7	9.6
Other white oaks	2,012.4		339.0	330.5	282.8	312.9	657.9	71.8	17.5
Other red oaks	4,081.4		710.7	873.3	744.8	523.6	1,088.9	108.8	31.3
Hickory	1,650.3		289.1	394.6	347.7	208.5	360.8	38.2	11.4
Yellow birch	90.5		5.4	13.0	22.9	13.8	32.9	2.5	.
Hard maple	185.2		29.8	27.2	33.0	25.0	53.5	16.7	.
Soft maple	1,751.1		354.3	416.2	263.7	299.6	398.0	19.3	.
Beech	361.0		49.4	64.5	63.2	44.5	125.7	13.7	.
Sweetgum	3,328.0		734.1	767.9	669.7	509.5	592.3	49.4	5.1
Tupelo and blackgum	4,462.4		844.9	848.9	899.0	705.9	1,036.0	102.8	24.9
Ash	567.2		121.4	103.3	116.8	91.3	108.8	13.7	11.9
Cottonwood	11.8			2.7	5.5	.	3.6	.	.
Basswood	197.6		34.3	49.4	45.9	34.0	34.0	.	.
Yellow-poplar	3,127.1		644.6	762.0	627.6	448.4	608.0	28.3	8.2
Black cherry	35.3		8.3	15.2	3.8	5.3	2.7	.	.
Black walnut	76.1		18.2	11.1	5.7	17.7	15.3	8.1	.
Other eastern hardwoods	1,601.2		334.9	358.2	257.9	220.6	367.6	49.3	12.7
Total	28,089.9		5,353.8	5,905.7	5,248.7	4,052.0	6,672.1	712.3	145.3
All species	54,333.4	5,300.8	11,658.0	11,263.2	9,067.2	6,503.3	9,485.6	887.3	168.0

[1] Includes *Quercus alba, Q. macrocarpa, Q. michauxii,* and *Q. bicolor.*
[2] *Includes Q. rubra, Q. falcata* var. *pagodaefolia,* and *Q. shumardii.*

Table 19. *Volume of sawtimber on commercial forest land, by species and log grade, North Carolina, 1964*

Species	All grades	Grade 1 logs	Grade 2 logs	Grade 3 logs	Grade 4 logs
	Million board feet				
Softwood:					
Yellow pines	23,491.5	980.1	5,564.5	11,347.8	5,599.1
Eastern white pine	892.9	21.2	25.5	548.6	297.6
Spruce and balsam fir	39.0	3.4	16.3	13.4	5.9
Cypress	1,198.9	106.2	500.1	411.9	180.7
Other eastern softwoods	621.2	55.5	258.6	213.3	93.8
Total	26,243.5	1,166.4	6,365.0	12,535.0	6,177.1
Hardwood:					
Select white and red oaks	4,551.3	754.6	1,096.5	2,043.8	656.4
Other white and red oaks	6,093.8	716.8	1,461.3	2,516.0	1,399.7
Hickory	1,650.3	209.7	294.3	766.0	380.3
Yellow birch	90.5	15.3	14.6	43.5	17.1
Hard maple	185.2	6.3	58.1	87.1	33.7
Sweetgum	3,328.0	470.3	943.4	1,597.1	317.2
Ash, walnut, and black cherry	678.6	132.1	191.7	279.0	75.8
Yellow-poplar	3,127.1	316.6	615.6	1,323.8	871.1
Other hardwoods	8,385.1	1,123.7	2,438.2	3,637.9	1,185.3
Total	28,089.9	3,745.4	7,113.7	12,294.2	4,936.6
All species	54,333.4	4,911.8	13,478.7	24,829.2	11,113.7

Table 20. *Volume of salvable dead sawtimber-size trees on commercial forest land, by softwood and hardwood, North Carolina, 1964*

Species group	Volume
	Million board feet
Softwood	22.2
Hardwood	33.7
All species	55.9

Table 21. *Net annual growth and annual cut of growing stock on commercial forest land, by species, North Carolina, 1963*

Species	Net annual growth	Annual timber cut [1]
	Million cubic feet	
Softwood:		
Yellow pines	400.6	351.0
Eastern white pine	11.6	3.7
Spruce and balsam fir	0.2	.
Cypress	7.1	12.6
Other eastern softwoods	10.1	3.9
Total	429.6	371.2
Hardwood:		
Select white and red oaks	52.4	45.9
Other white and red oaks	78.7	56.6
Hickory	15.7	9.8
Yellow birch	3.3	0.1
Hard maple	1.7	0.5
Sweetgum	45.6	44.5
Ash, walnut, and black cherry	12.0	9.7
Yellow-poplar	64.4	37.9
Other hardwoods	108.7	84.7
Total	382.5	289.7
All species	812.1	660.9

[1] Annual cut based on trend level between 1955 and 1963 as developed from the remeasurement of permanent sample plots.

Table 22. *Net annual growth and cut of growing stock on commercial forest land, by ownership classes and by softwood and hardwood, North Carolina, 1963.*

Ownership class	Net annual growth			Annual timber cut [1]		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet					
National Forest	41.6	10.5	31.1	10.7	4.0	6.7
Other public	23.3	15.8	7.5	11.3	8.8	2.5
Forest industry	83.6	47.4	36.2	70.4	39.8	30.6
Farmer and misc private	663.6	355.9	307.7	568.5	318.6	249.9
All ownerships	812.1	429.6	382.5	660.9	371.2	289.7

[1] Annual cut based on trend level between 1955 and 1963 as developed from the remeasurement of permanent sample plots.

Table 23. *Net annual growth and cut of sawtimber on commercial forest land, by species, North Carolina, 1963*

Species	Net annual growth	Annual timber cut [1]
	Million board feet	
Softwood:		
Yellow pines	1,448.5	1,177.1
Eastern white pine	51.4	16.2
Spruce and balsam fir	1.3	.
Cypress	34.0	46.0
Other eastern softwoods	22.0	11.1
Total	1,557.2	1,250.4
Hardwood:		
Select white and red oaks	162.3	141.0
Other white and red oaks	225.4	159.8
Hickory	54.3	34.2
Yellow birch	4.6	0.4
Hard maple	5.0	3.1
Sweetgum	132.0	140.0
Ash, walnut, and black cherry	26.8	26.7
Yellow-poplar	182.2	112.1
Other hardwoods	255.4	246.2
Total	1,048.0	863.5
All species	2,605.2	2,113.9

[1] Annual cut based on trend level between 1955 and 1963 as developed from the remeasurement of permanent sample plots.

Table 24. *Net annual growth and cut of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, North Carolina, 1963*

Ownership class	Net annual growth			Annual timber cut [1]		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million board feet					
National Forest	129.0	38.8	90.2	37.5	12.6	24.9
Other public	86.6	67.6	19.0	44.3	35.3	9.0
Forest industry	285.3	187.5	97.8	236.7	151.7	85.0
Farmer and misc. private	2,104.3	1,263.3	841.0	1,795.4	1,050.8	744.6
All ownerships	2,605.2	1,557.2	1,048.0	2,113.9	1,250.4	863.5

[1] Annual cut based on trend level between 1955 and 1963 as developed from the remeasurement of permanent sample plots.

Table 25. *Annual mortality [1] of growing stock and sawtimber on commercial forest land, by species, North Carolina, 1963*

Species	Growing stock	Sawtimber
	Million cubic feet	*Million board feet*
Softwood:		
Yellow pines	59.6	144.5
Eastern white pine	0.3	1.2
Spruce and balsam fir	0.3	2.2
Cypress	3.2	14.0
Other eastern softwoods	6.3	32.1
Total	69.7	194.0
Hardwood:		
Select white and red oaks	10.7	41.4
Other white and red oaks	26.2	79.7
Hickory	3.9	12.9
Yellow birch	(2)	(2)
Hard maple	0.1	0.2
Sweetgum	12.0	36.2
Ash, walnut, and black cherry	1.8	4.7
Yellow-poplar	4.3	9.3
Other hardwoods	32.0	78.2
Total	91.0	262.6
All species	160.7	456.6

[1] Average annual mortality between 1955 and 1963 from the remeasurement of permanent sample plots.
[2] Negligible.

Table 26. *Annual mortality [1] of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, North Carolina, 1963*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
National Forest	8.0	1.6	6.4	26.2	4.4	21.8
Other public	4.5	3.3	1.2	13.8	9.3	4.5
Forest industry	28.3	17.7	10.6	92.2	58.5	33.7
Farmer and misc. private	119.9	47.1	72.8	324.4	121.8	202.6
All ownerships	160.7	69.7	91.0	456.6	194.0	262.6

[1] Average annual mortality between 1955 and 1963 from the remeasurement of permanent sample plots.

Table 27. *Annual mortality [1] of growing stock and sawtimber on commercial forest land, by causes and by softwood and hardwood, North Carolina, 1963*

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
Fire	11.5	9.4	2.1	20.9	17.4	3.5
Insects	4.9	4.6	0.3	19.4	18.4	1.0
Disease	3.3	1.4	1.9	11.3	5.4	5.9
Other	64.0	27.7	36.3	203.7	80.5	123.2
Unknown	77.0	26.6	50.4	201.3	72.3	129.0
All causes	160.7	69.7	91.0	456.6	194.0	262.6

[1] Average annual mortality between 1955 and 1963 from the remeasurement of permanent sample plots.

Table 28. *Total output of timber products, by product, by type of material used, and by softwood and hardwood, North Carolina, 1964* [1]

Product and species group	Total output in standard units		Output from roundwood		Output from plant byproducts
	Unit	*Number*	*Standard units*	*M cubic feet*	*Standard units*
Saw logs:					
Softwood	M bd. ft. [2]	922,061	922,061	169,632	
Hardwood	M bd. ft. [2]	458,979	458,979	73,610	
Total	M bd. ft. [2]	1,381,040	1,381,040	243,242	
Veneer logs and bolts:					
Softwood	M bd. ft.	4,707	4,707	710	
Hardwood	M bd. ft.	155,118	155,118	23,604	
Total	M bd. ft.	159,825	159,825	24,314	
Cooperage logs and bolts:					
Softwood	M bd. ft.				
Hardwood	M bd. ft.	6,388	6,388	862	
Total	M bd. ft.	6,388	6,388	862	
Pulpwood:					
Softwood	Std. cords [3]	1,964,563	1,527,749	113,665	436,814
Hardwood	Std. cords [3]	659,879	542,432	40,411	117,447
Total	Std. cords [3]	2,624,442	2,070,181	154,076	554,261
Piling:					
Softwood	M linear ft.	500	500	256	
Hardwood	M linear ft.	125	125	64	
Total	M linear ft.	625	625	320	
Poles:					
Softwood	M pieces	185	185	2,633	
Hardwood	M pieces				
Total	M pieces	185	185	2,633	
Misc. industrial wood: [4]					
Softwood	M cu. ft.	3,756	3,756	3,756	
Hardwood	M cu. ft.	15,231	8,387	8,387	6,844
Total	M cu. ft.	18,987	12,143	12,143	6,844
Posts (round and split):					
Softwood	M pieces	1,920	1,920	1,154	
Hardwood	M pieces	567	567	369	
Total	M pieces	2,487	2,487	1,523	
Fuelwood: [5]					
Softwood	Std. cords	294,419	245,351	18,254	49,068
Hardwood	Std. cords	519,661	433,054	32,263	86,607
Total	Std. cords	814,080	678,405	50,517	135,675
All products:					
Softwood	M cu. ft.			310,060	
Hardwood	M cu. ft.			179,570	
Total	M cu. ft.			489,630	

[1] Based on 1964 state commodity drain survey.
[2] International ¼-inch rule.
[3] Rough wood basis.
[4] Includes excelsior bolts, turnery bolts, etc.
[5] Used for domestic heating and cooking; excludes industrial use.

Table 29. *Total output of roundwood products, by source and by softwood and hardwood, North Carolina, 1964*

Source	All species	Softwood	Hardwood
	– – *Thousand cubic feet* – –		
Growing-stock trees: [1]			
Sawtimber trees	334,052	209,112	124,940
Poletimber trees	73,132	50,136	22,996
Material left after logging [2]	39,724	29,257	10,467
Total	446,908	288,505	158,403
Cull trees [1]	22,311	7,405	14,906
Salvable dead trees [1]	6,213	2,126	4,087
Other sources [3]	14,198	12,024	2,174
All sources	489,630	310,060	179,570

[1] On commercial forest land.
[2] Material from growing-stock trees left after cutting for a specific product, but subsequently removed for other products.
[3] Includes trees less than 5.0 inches in diameter, and treetops and limbs.

Table 30. *Annual timber cut* [1] *from growing stock on commercial forest land, by product and logging residues, and by softwood and hardwood, North Carolina, 1964*

Product and residues	All species	Softwood	Hardwood
	– – *Thousand cubic feet* – –		
Roundwood products:			
Saw logs	239,299	166,426	72,873
Veneer logs and bolts	23,532	657	22,875
Cooperage logs and bolts	862		862
Pulpwood	142,870	103,526	39,344
Piling	320	256	64
Poles	2,608	2,608	
Misc. industrial wood	11,501	3,542	7,959
Posts	950	720	230
Fuelwood	24,966	10,770	14,196
All products	446,908	288,505	158,403
Logging residues:			
Harvesting	83,775	21,236	62,539
Land clearing	55,892	27,595	28,297
Cultural operations	3,035	165	2,870
Total	142,702	48,996	93,706
Timber cut	589,610	337,501	252,109

[1] Timber cut based on estimates of timber products output in 1964, by product.

Table 31. *Annual timber cut [1] from live sawtimber on commercial forest land, by product and logging residues, and by softwood and hardwood, North Carolina, 1964*

Product and residues	All species	Softwood	Hardwood
		Thousand board feet [2]	
Roundwood products:			
Saw logs	1,251,849	851,320	400,529
Veneer logs and bolts	107,734	4,714	103,020
Cooperage logs and bolts	5,431		5,431
Pulpwood	377,020	219,256	157,764
Piling	1,500	1,199	301
Poles	14,847	14,847	
Misc. industrial wood	33,368	8,765	24,603
Posts	1,493	1,132	361
Fuelwood	11,062		11,062
All products	1,804,304	1,101,233	703,071
Logging residues:			
Harvesting	96,111	31,874	64,237
Land clearing	121,089	54,805	66,284
Cultural operations	7,859	239	7,620
Total	225,059	86,918	138,141
Timber cut	2,029,363	1,188,151	841,212

[1] Timber cut based on estimates of timber products output in 1964, by product.
[2] International ¼-inch rule.

Table 32. *Volume of plant residues, by industrial source and type of residue, and by softwood and hardwood, North Carolina, 1964*

Industrial source	All species			Softwood			Hardwood		
	Total	Coarse [1]	Fine [2]	Total	Coarse [1]	Fine [2]	Total	Coarse [1]	Fine [2]
				Thousand cubic feet					
Lumber industry	64,052	18,497	45,555	43,863	12,669	31,194	20,189	5,828	14,361
Veneer and plywood industry	668	369	299	20	15	5	648	354	294
Other primary industries	809	246	563	208	79	129	601	167	434
All industries	65,529	19,112	46,417	44,091	12,763	31,328	21,438	6,349	15,089

[1] Unused material suitable for chipping, such as slabs, edgings, and veneer cores.
[2] Unused material not suitable for chipping, such as sawdust and shavings.

Table 33. *Timber growth projections, North Carolina, 1963 to 1993 [1]*

Period	Assumed cut			Projected growth		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
			GROWING STOCK			
			Thousand cubic feet			
1963 (year of inventory)	660,900	371,200	289,700	812,100	429,600	382,500
1973 (plus 10 years)	860,300	448,800	411,500	973,900	506,200	467,700
1983 (plus 20 years)	1,026,100	502,200	523,900	1,111,000	545,800	565,200
1993 (plus 30 years)	1,149,700	541,000	608,700	1,205,200	569,000	636,200
			SAWTIMBER			
			Thousand board feet [2]			
1963 (year of inventory)	2,113,900	1,250,400	863,500	2,605,200	1,557,200	1,048,000
1973 (plus 10 years)	2,657,700	1,514,800	1,142,900	2,710,300	1,749,700	960,600
1983 (plus 20 years)	2,818,400	1,644,500	1,173,900	2,806,700	1,817,400	989,300
1993 (plus 30 years)	2,884,900	1,746,600	1,138,300	2,863,800	1,864,200	999,600

[1] Based on the assumption that cut starting at the 1963 level will be in balance with the growth by the year 2013, and that forestry progress will continue at the rate indicated by recent trends.
[2] International ¼-inch rule.

Table 34. *Volume of timber, by species group and timber quality, North Carolina, 1964*

Species group	Timber quality				
	Growing stock			Cull trees	All timber
	Desirable	Other	Total		
			Million cubic feet		
Softwood	3,802.0	4,211.4	8,013.4	212.4	8,225.8
Hardwood	3,488.2	6,963.1	10,451.3	2,148.7	12,600.0
Total	7,290.2	11,174.5	18,464.7	2,361.1	20,825.8

Table 35. *Basal area per acre of growing-stock and cull trees 5.0 inches d.b.h. and larger, by forest type and Survey Unit, North Carolina, 1964*

Forest type	State	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Mountains
	Square feet				
White pine-hemlock:					
Growing stock	55.6	.	.	.	55.6
Cull	7.3	.	.	.	7.3
All trees	62.9	.	.	.	62.9
Spruce-fir:					
Growing stock	40.7	.	.	.	40.7
Cull	13.5	.	.	.	13.5
All trees	54.2	.	.	.	54.2
Longleaf-slash pine:					
Growing stock	36.1	35.3	45.8	45.7	
Cull	0.8	0.8	.	1.7	.
All trees	36.9	36.1	45.8	47.4	.
Loblolly-shortleaf pine:					
Growing stock	51.0	45.6	57.4	50.7	53.2
Cull	3.6	2.3	2.6	4.9	6.2
All trees	54.6	47.9	60.0	55.6	59.4
Oak-pine:					
Growing stock	42.3	32.6	53.4	43.5	44.8
Cull	6.4	3.7	6.1	8.1	7.9
All trees	48.7	36.3	59.5	51.6	52.7
Oak-hickory:					
Growing stock	45.4	26.8	48.9	44.9	49.9
Cull	10.9	5.4	6.8	10.5	12.9
All trees	56.3	32.2	55.7	55.4	62.8
Oak-gum-cypress:					
Growing stock	63.5	58.8	68.4	39.2	.
Cull	12.8	11.7	14.4	18.0	.
All trees	76.3	70.5	82.8	57.2	.
Elm-ash-cottonwood:					
Growing stock	48.2	76.2	66.0	37.1	42.5
Cull	16.2	19.6	12.7	16.1	38.6
All trees	64.4	95.8	78.7	53.2	81.1
Maple-beech-birch:					
Growing stock	46.5	.	.	.	46.5
Cull	17.3	.	.	.	17.3
All trees	63.8	.	.	.	63.8
All types:					
Growing stock	49.2	43.5	59.9	46.5	49.4
Cull	7.9	5.2	7.1	8.1	11.9
All trees	57.1	48.7	67.0	54.6	61.3

Table 36. *Number of growing-stock and cull trees 1.0-4.9 inches d.b.h. per acre, by forest type and Survey Unit, North Carolina, 1964*

Forest type	State	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Mountains
	Number of trees per acre				
White pine-hemlock:					
Growing stock	358				358
Cull	176				176
All trees	534				534
Spruce-fir:					
Growing stock	339				339
Cull	326				326
All trees	665				665
Longleaf-slash pine:					
Growing stock	226	200	697	39	
Cull	100	104	21	79	
All trees	326	304	718	118	
Loblolly-shortleaf pine:					
Growing stock	509	502	582	474	397
Cull	164	133	163	191	182
All trees	673	635	745	665	579
Oak-pine:					
Growing stock	440	473	550	383	365
Cull	258	236	191	310	263
All trees	698	709	741	693	628
Oak-hickory:					
Growing stock	302	330	478	299	277
Cull	308	348	268	345	270
All trees	610	678	746	644	547
Oak-gum-cypress:					
Growing stock	534	524	549	166	
Cull	204	214	191	375	
All trees	738	738	740	541	
Elm-ash-cottonwood:					
Growing stock	269	461	457	166	681
Cull	244	243	278	235	188
All trees	513	704	735	401	869
Maple-beech-birch:					
Growing stock	396				396
Cull	192				192
All trees	588				588
All types:					
Growing stock	424	457	557	374	312
Cull	229	193	185	279	252
All trees	653	650	742	653	564

Table 37. *Average net volume per acre on commercial forest land, by area description and species group, North Carolina, 1964*

Area description	Softwood		Hardwood		Total	
	Cubic feet	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*
Pine types: [1]						
Site class 1						
Growing stock						
Desirable	804.1	3,732	114.2	305	918.3	4,037
Other	1,003.5	3,820	218.2	567	1,221.7	4,387
Culls	17.6		56.4		74.0	
Total	1,825.2	7,552	388.8	872	2,214.0	8,424
Site class 2						
Growing stock						
Desirable	619.5	2,550	64.4	165	683.9	2,715
Other	614.9	2,045	119.4	250	734.3	2,295
Culls	15.5		29.1		44.6	
Total	1,249.9	4,595	212.9	415	1,462.8	5,010
Site class 3						
Growing stock						
Desirable	303.9	939	31.3	82	335.2	1,021
Other	357.4	922	71.6	131	429.0	1,053
Culls	19.8		28.1		47.9	
Total	681.1	1,861	131.0	213	812.1	2,074
Site class 4						
Growing stock						
Desirable	185.9	478	11.9	29	197.8	507
Other	253.9	506	33.3	54	287.2	560
Culls	19.0		20.3		39.3	
Total	458.8	984	65.5	83	524.3	1,067
Oak-pine type:						
Site class 1						
Growing stock						
Desirable	347.1	1,594	458.4	1,587	805.5	3,181
Other	311.1	1,115	387.8	1,063	698.9	2,178
Culls	2.5		86.0		88.5	
Total	660.7	2,709	932.2	2,650	1,592.9	5,359
Site class 2						
Growing stock						
Desirable	292.8	1,236	195.7	592	488.5	1,828
Other	278.5	920	374.2	882	652.7	1,802
Culls	10.0		85.0		95.0	
Total	581.3	2,156	654.9	1,474	1,236.2	3,630
Site class 3						
Growing stock						
Desirable	151.5	504	103.1	263	254.6	767
Other	161.8	419	216.9	468	378.7	887
Culls	7.7		64.5		72.2	
Total	321.0	923	384.5	731	705.5	1,654
Site class 4						
Growing stock						
Desirable	95.0	247	56.8	161	151.8	408
Other	142.9	287	177.0	331	319.9	618
Culls	14.9		94.3		109.2	
Total	252.8	534	328.1	492	580.9	1,026
Oak-hickory type: [2]						
Site class 1						
Growing stock						
Desirable	85.6	348	283.7	886	369.3	1,234
Other	55.1	170	453.9	1,127	509.0	1,297
Culls	5.3		129.7		135.0	
Total	146.0	518	867.3	2,013	1,013.3	2,531
Site class 2						
Growing stock						
Desirable	50.9	190	382.2	1,247	433.1	1,437
Other	47.7	118	597.0	1,560	644.7	1,678
Culls	4.3		166.5		170.8	
Total	102.9	308	1,145.7	2,807	1,248.6	3,115
Oak-hickory type: [2]						
Site class 3						
Growing stock						
Desirable	40.2	141	209.4	656	249.6	797
Other	37.6	97	592.9	1,536	630.5	1,633
Culls	3.4		185.1		186.5	
Total	81.2	238	987.4	2,192	1,068.6	2,430
Site class 4						
Growing stock						
Desirable	27.9	80	138.9	401	166.8	481
Other	34.3	74	395.0	953	429.3	1,027
Culls	3.2		187.8		191.0	
Total	65.4	154	721.7	1,354	787.1	1,508
Oak-gum-cypress: [3]						
Site class 1						
Growing stock						
Desirable	69.5	245	835.9	3,109	905.4	3,354
Other	56.9	194	1,149.5	3,214	1,206.4	3,408
Culls	3.8		208.6		212.4	
Total	130.2	439	2,194.0	6,323	2,324.2	6,762
Site class 2						
Growing stock						
Desirable	42.0	200	597.9	1,958	639.9	2,158
Other	53.5	209	957.0	2,575	1,010.5	2,784
Culls	5.6		220.0		225.6	
Total	101.1	409	1,774.9	4,533	1,876.0	4,942
Site class 3						
Growing stock						
Desirable	86.0	417	257.2	912	343.2	1,329
Other	73.0	282	697.4	1,649	770.4	1,931
Culls	10.3		162.6		172.9	
Total	169.3	699	1,117.2	2,561	1,286.5	3,260
Site class 4						
Growing stock						
Desirable	167.1	828	120.8	417	287.9	1,245
Other	229.0	923	379.2	917	608.2	1,840
Culls	8.0		104.5		112.5	
Total	404.1	1,751	604.5	1,334	1,008.6	3,085
All types:						
Site class 1						
Growing stock						
Desirable	356.7	1,620	408.9	1,422	765.6	3,042
Other	403.7	1,509	554.9	1,500	958.6	3,009
Culls	8.3		120.0		128.3	
Total	768.7	3,129	1,083.8	2,922	1,852.5	6,051
Site class 2						
Growing stock						
Desirable	315.4	1,306	267.4	847	582.8	2,153
Other	312.5	1,036	443.5	1,131	756.0	2,167
Culls	10.0		108.5		118.5	
Total	637.9	2,342	819.4	1,978	1,457.3	4,320
Site class 3						
Growing stock						
Desirable	158.4	523	135.6	424	294.0	947
Other	176.2	468	360.4	875	536.6	1,343
Culls	10.9		105.9		116.8	
Total	345.5	991	601.9	1,299	947.4	2,290
Site class 4						
Growing stock						
Desirable	106.7	311	78.8	231	185.5	542
Other	146.4	333	229.5	529	375.9	862
Culls	11.1		106.1		117.2	
Total	264.2	644	414.4	760	678.6	1,404

[1] Includes all softwood types. [2] Includes maple-beech-birch types. [3] Includes elm-ash-cottonwood types.

Table 38. *Average net volume and growth per acre on commercial forest land, by ownership, tree class, and species group, North Carolina, 1964*

Ownership and tree class	Net volume per acre						Net growth per acre					
	Softwood		Hardwood		Total		Softwood		Hardwood		Total	
	Cubic feet	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*
National Forest:												
Growing stock												
Desirable	143.8	532	271.1	928	414.9	1,460	6.7	22	11.1	34	17.8	56
Other	139.1	411	579.9	1,604	719.0	2,015	4.8	13	19.9	58	24.7	71
Culls	10.3		261.6		271.9		0.3		6.8		7.1	
Total	293.2	943	1,112.6	2,532	1,405.8	3,475	11.8	35	37.8	92	49.6	127
Other public:												
Growing stock												
Desirable	204.4	686	133.0	452	337.4	1,138	15.3	54	4.9	12	20.2	66
Other	209.2	631	212.4	606	421.6	1,237	10.6	34	7.0	14	17.6	48
Culls	10.6		71.7		82.3		1.0		2.2		3.2	
Total	424.2	1,317	417.1	1,058	841.3	2,375	26.9	88	14.1	26	41.0	114
Forest industry:												
Growing stock												
Desirable	199.5	805	139.6	448	339.1	1,253	14.5	39	7.1	21	21.6	60
Other	246.5	827	293.1	702	539.6	1,529	10.0	33	10.1	18	20.1	51
Culls	10.4		73.6		84.0		0.6		2.6		3.2	
Total	456.4	1,632	506.3	1,150	962.7	2,782	25.1	72	19.8	39	44.9	111
Farmer-owned:												
Growing stock												
Desirable	202.7	750	183.9	579	386.6	1,329	15.9	45	9.2	24	25.1	69
Other	219.6	641	356.2	861	575.8	1,502	12.6	41	13.7	32	26.3	73
Culls	10.5		99.4		109.9		1.0		3.6		4.6	
Total	432.8	1,391	639.5	1,440	1,072.3	2,831	29.5	86	26.5	56	56.0	142
Misc. private:												
Growing stock												
Desirable	173.6	608	162.1	495	335.7	1,103	13.6	39	8.2	20	21.8	59
Other	194.6	522	333.0	803	527.6	1,325	11.1	33	12.9	30	24.0	63
Culls	10.9		110.3		121.2		0.8		3.8		4.6	
Total	379.1	1,130	605.4	1,298	984.5	2,428	25.5	72	24.9	50	50.4	122
All ownerships:												
Growing stock												
Desirable	189.8	697	174.2	550	364.0	1,247	14.5	41	8.6	22	23.1	63
Other	210.3	613	347.7	853	558.0	1,466	11.3	36	13.1	31	24.4	67
Culls	10.6		107.3		117.9		0.8		3.7		4.5	
Total	410.7	1,310	629.2	1,403	1,039.9	2,713	26.6	77	25.4	53	52.0	130

Table 39. *Land area, by class and major forest type, North Carolina, 1938, 1955, and 1964*

Land class and forest type	1938	1955	1964	Change 1955-1964
		Thousand acres		
Commercial forest land:				
Pine and oak-pine type	11,639.1	10,021.9	10,697.8	+675.9
Hardwood type	6,462.6	9,319.5	9,329.5	+ 10.0
Total	18,101.7	19,341.4	20,027.3	+685.9
Noncommercial forest land	298.1	734.3	420.8	−313.5
Nonforest land	12,604.5	11,192.2	10,755.6	−436.6
All land [1]	31,004.3	31,267.9	31,203.7	− 64.2

[1] Excludes all water areas.

Table 40. *Volume [1] of sawtimber, growing stock, and all timber, by species group and diameter class, North Carolina, 1938, 1955, and 1964*

Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
		SAWTIMBER (In million board feet, International ¼-inch rule)									
Pine [2]	1938	23,902.8	.	.	4,635.3	5,822.6	4,872.0	3,298.7	2,159.8	1,232.5	1,881.9
	1955	22,519.0	.	.	4,846.6	5,741.5	4,485.6	3,035.8	1,849.6	1,057.2	1,502.7
	1964	25,044.6	.	.	5,224.5	6,155.5	5,129.1	3,643.5	2,257.6	1,120.3	1,514.1
Cypress	1938	1,447.3	.	.	116.9	207.3	216.7	251.0	159.6	142.7	353.1
	1955	1,286.7	.	.	93.2	195.9	209.5	239.0	182.0	120.5	246.6
	1964	1,198.9	.	.	76.3	148.7	228.4	175.0	193.7	135.6	241.2
Hardwood	1938	21,280.4	.	.	.	3,561.0	4,061.9	3,666.1	3,102.8	2,097.4	4,791.2
	1955	26,780.6	.	.	.	4,771.2	5,549.0	4,682.7	3,824.4	2,680.4	5,272.9
	1964	28,089.9	.	.	.	5,353.8	5,905.7	5,248.7	4,052.0	2,612.2	4,917.5
		GROWING STOCK (In million cubic feet)									
Pine [2]	1938	7,047.1	659.2	1,075.5	1,336.1	1,326.1	1,000.2	645.8	410.8	233.1	360.3
	1955	7,176.3	809.2	1,309.2	1,397.9	1,308.2	917.6	591.9	352.7	199.8	289.8
	1964	7,741.5	843.5	1,312.7	1,501.8	1,403.4	1,051.5	707.2	425.9	210.6	284.9
Cypress	1938	358.3	17.2	30.0	41.6	55.2	47.2	48.3	29.8	24.5	64.5
	1955	317.0	12.6	28.6	32.7	51.7	45.8	46.0	33.9	20.7	45.0
	1964	271.9	4.0	15.1	26.7	38.9	50.3	33.7	36.2	23.3	43.7
Hardwood	1938	7,337.3	603.6	801.5	1,076.2	1,046.2	979.2	797.6	643.7	426.1	963.2
	1955	9,772.9	781.6	1,242.3	1,606.2	1,401.0	1,333.5	1,015.6	792.6	540.3	1,059.8
	1964	10,451.3	943.1	1,344.4	1,687.6	1,569.3	1,415.4	1,136.6	837.7	527.6	989.6
		ALL TIMBER (In million cubic feet)									
Pine [2]	1938	7,228.1	681.3	1,098.9	1,395.8	1,352.3	1,019.5	654.7	416.0	237.1	372.5
	1955	7,366.0	837.2	1,338.3	1,461.4	1,334.1	934.2	598.9	357.1	203.3	301.5
	1964	7,934.3	870.6	1,340.7	1,567.8	1,430.7	1,071.2	714.4	430.7	214.0	294.2
Cypress	1938	384.3	17.6	31.5	44.8	56.4	49.0	48.7	31.3	26.9	78.1
	1955	338.8	12.9	30.0	35.5	52.7	47.6	46.5	36.6	22.5	54.5
	1964	291.5	4.1	15.7	29.0	39.6	52.5	34.3	37.7	25.5	53.1
Hardwood	1938	8,835.1	794.0	970.4	1,249.3	1,253.3	1,120.7	905.7	747.0	502.9	1,291.8
	1955	11,775.3	1,034.7	1,508.7	1,869.9	1,685.5	1,528.1	1,156.1	921.4	642.9	1,428.0
	1964	12,600.0	1,246.0	1,626.6	1,964.3	1,889.6	1,625.0	1,297.0	974.8	628.1	1,348.6

[1] In order to provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in previous surveys.

[2] Includes all softwoods except cypress.

Table 41. *Volume of all timber, by species group and Survey Unit, North Carolina, 1938, 1955, and 1964*

Species group and Survey Unit	1938	1955	Change 1938-1955	1964	Change 1955-1964
	Million cubic feet		*Percent*	*Million cubic feet*	*Percent*
Pine: [1]					
Southern Coastal Plain	2,010.7	1,951.8	− 2.9	2,294.5	+17.6
Northern Coastal Plain	2,176.8	2,220.3	+ 2.0	2,527.0	+13.8
Piedmont	2,376.3	2,383.9	+ 0.3	2,245.3	− 5.8
Mountains	664.3	810.0	+21.9	867.5	+ 7.1
All units	7,228.1	7,366.0	+ 1.9	7,934.3	+ 7.7
Cypress:					
Southern Coastal Plain	118.8	116.7	− 1.8	103.0	−11.7
Northern Coastal Plain	265.5	222.1	−16.3	188.5	−15.1
Piedmont	.	.	.	.	.
Mountains	.	.	.	.	.
All units	384.3	338.8	−11.8	291.5	−14.0
Hardwood:					
Southern Coastal Plain	1,964.4	2,300.0	+17.1	2,355.7	+ 2.4
Northern Coastal Plain	2,229.8	2,800.6	+25.6	2,975.5	+ 6.2
Piedmont	2,227.9	3,157.7	+41.7	3,365.6	+ 6.6
Mountains	2,413.0	3,517.0	+45.8	3,903.2	+11.0
All units	8,835.1	11,775.3	+33.3	12,600.0	+ 7.0

[1] Includes other softwoods except cypress.

COUNTY TABLES

The tables that follow are intended for use in compiling forest resource estimates for groups of counties. Because the sampling procedure used by the Forest Survey in North Carolina was intended primarily to furnish inventory data for the State as a whole, individual county estimates have limited and variable accuracy. As county totals are broken down by various subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the tabulation on page 20.

Table 42. *Land area and commercial forest, by county, North Carolina, 1964*

County	All land	Commercial forest		County	All land	Commercial forest	
	Thousand acres	*Thousand acres*	*Per-cent*		*Thousand acres*	*Thousand acres*	*Per-cent*
Alamance	274.2	128.9	47.0	Jones	298.9	233.0	78.0
Alexander	164.0	98.8	60.2	Lee	163.8	111.0	67.8
Alleghany	147.2	66.1	44.9	Lenoir	250.2	139.0	55.6
Anson	341.1	240.6	70.5	Lincoln	194.2	94.1	48.5
Ashe	273.3	149.0	54.5	McDowell	282.9	230.9	81.6
Avery	158.1	126.2	79.8	Macon	330.9	274.3	82.9
Beaufort	531.9	354.2	66.6	Madison	291.8	216.0	74.0
Bertie	443.5	321.1	72.4	Martin	307.9	200.9	65.2
Bladen	562.6	455.9	81.0	Mecklenburg	342.7	166.2	48.5
Brunswick	558.3	461.2	82.6	Mitchell	140.8	111.0	78.8
Buncombe	412.8	290.9	70.5	Montgomery	313.8	268.0	85.4
Burke	323.8	239.0	73.8	Moore	482.2	393.5	81.6
Cabarrus	230.4	99.8	43.3	Nash	353.3	180.0	50.9
Caldwell	304.7	227.3	74.6	New Hanover	124.2	76.8	61.8
Camden	153 0	103.3	67.5	Northampton	345.0	206.8	59.9
Carteret	340.5	236.8	69.5	Onslow	483.8	367.5	76.0
Caswell	278.4	184.0	66.1	Orange	254.7	154.5	60.7
Catawba	253.9	123.0	48.4	Pamlico	218.2	140.4	64.3
Chatham	452.5	343.6	75.9	Pasquotank	146.6	81.8	55.8
Cherokee	290.6	259.8	89.4	Pender	548.5	466.1	85.0
Chowan	115.2	68.6	59.5	Perquimans	167.1	101.2	60.6
Clay	136.3	114.4	83.9	Person	256.0	155.4	60.7
Cleveland	298.2	127.5	42.8	Pitt	419.8	216.4	51.5
Columbus	601.0	422.1	70.2	Polk	149.9	110.9	74.0
Craven	464.0	351.3	75.7	Randolph	512.6	315.0	61.5
Cumberland	423.1	254.1	60.1	Richmond	305.3	222.1	72.7
Currituck	174.7	84.4	48.3	Robeson	604.1	318.1	52.7
Dare	248.3	161.1	64.9	Rockingham	366.1	243.9	66.6
Davidson	349.8	179.0	51.2	Rowan	330.9	138.4	41.8
Davie	168.9	74.9	44.3	Rutherford	362.2	255.7	70.6
Duplin	526.7	339.0	64.4	Sampson	616.3	395.1	64.1
Durham	191.3	115.9	60.6	Scotland	202.9	106.8	52.6
Edgecombe	327.0	160.5	49.1	Stanly	255.3	107.4	42.1
Forsyth	271.3	133.7	49.3	Stokes	293.8	179.1	61.0
Franklin	316.1	185.0	58.5	Surry	343.7	193.5	56.3
Gaston	225.6	122.5	54.3	Swain	339.2	114.8	33.8
Gates	219.5	162.8	74.2	Transylvania	242.3	212.3	87.6
Graham	185.0	172.7	93.4	Tyrrell	255.4	216.9	84.9
Granville	346.9	228.0	65.7	Union	411.5	197.2	47.9
Greene	172.2	82.4	47.9	Vance	160.6	95.8	59.7
Guilford	416.7	191.8	46.0	Wake	553.0	312.6	56.5
Halifax	462.1	273.0	59.1	Warren	280.2	193.6	69.1
Harnett	388.4	244.0	62.8	Washington	215.0	142.9	66.5
Haywood	347.5	193.4	55.7	Watauga	204.8	121.1	59.1
Henderson	244.5	161.5	66.1	Wayne	355.2	157.8	44.4
Hertford	227.8	149.4	65.6	Wilkes	488.3	365.8	74.9
Hoke	212.9	146.9	69.0	Wilson	238.7	113.3	47.5
Hyde	405.8	275.3	67.8	Yadkin	214.4	99.2	46.3
Iredell	362.1	157.1	43.4	Yancey	199.0	142.8	71.8
Jackson	316.8	267.2	84.3				
Johnston	508.8	261.4	51.4	Total	31,367.3	20,027.3	63.8

Table 43. *Commercial forest land, by county and ownership, North Carolina, 1964*

County	All ownerships	Public			Private	County	All ownerships	Public			Private
		National Forest	Other public	Total				National Forest	Other public	Total	
	Thousand acres						*Thousand acres*				
Alamance	128.9	.	0.3	0.3	128.6	Jones	233.0	35.2	27.4	62.6	170.4
Alexander	98.8	.	(1)	(1)	98.8	Lee	111.0	.	(1)	(1)	111.0
Alleghany	66.1	.	(1)	(1)	66.1	Lenoir	139.0	.	0.8	0.8	138.2
Anson	240.6	.	0.1	0.1	240.5	Lincoln	94.1	.	0.1	0.1	94.0
Ashe	149.0	.	0.1	0.1	148.9	McDowell	230.9	64.9	0.9	65.8	165.1
Avery	126.2	21.0	0.1	21.1	105.1	Macon	274.3	141.6	(1)	141.6	132.7
Beaufort	354.2	.	3.2	3.2	351.0	Madison	216.0	45.6	1.5	47.1	168.9
Bertie	321.1	.	0.3	0.3	320.8	Martin	200.9	.	0.1	0.1	200.8
Bladen	455.9	.	31.7	31.7	424.2	Mecklenburg	166.2	.	2.0	2.0	164.2
Brunswick	461.2	.	11.6	11.6	449.6	Mitchell	111.0	15.7	2.2	17.9	93.1
Buncombe	290.9	29.0	26.1	55.1	235.8	Montgomery	268.0	34.2	0.2	34.4	233.6
Burke	239.0	38.0	9.7	47.7	191.3	Moore	393.5	.	30.1	30.1	363.4
Cabarrus	99.8	.	0.4	0.4	99.4	Nash	180.0	.	0.1	0.1	179.9
Caldwell	227.3	48.9	1.1	50.0	177.3	New Hanover	76.8	.	1.0	1.0	75.8
Camden	103.3	.	0.1	0.1	103.2	Northampton	206.8	.	1.9	1.9	204.9
Carteret	236.8	55.3	11.2	66.5	170.3	Onslow	367.5	.	122.6	122.6	244.9
Caswell	184.0	.	13.3	13.3	170.7	Orange	154.5	.	1.7	1.7	152.8
Catawba	123.0	.	0.3	0.3	122.7	Pamlico	140.4	.	1.0	1.0	139.4
Chatham	343.6	.	1.8	1.8	341.8	Pasquotank	81.8	.	(1)	(1)	81.8
Cherokee	259.8	81.1	6.8	87.9	171.9	Pender	466.1	.	63.0	63.0	403.1
Chowan	68.6	.	0.1	0.1	68.5	Perquimans	101.2	.	0.1	0.1	101.1
Clay	114.4	58.6	.	58.6	55.8	Person	155.4	.	0.4	0.4	155.0
Cleveland	127.5	.	(1)	(1)	127.5	Pitt	216.4	.	0.3	0.3	216.1
Columbus	422.1	.	0.3	0.3	421.8	Polk	110.9	.	5.3	5.3	105.6
Craven	351.3	53.1	6.5	59.6	291.7	Randolph	315.0	8.1	0.7	8.8	306.2
Cumberland	254.1	.	32.2	32.2	221.9	Richmond	222.1	.	29.8	29.8	192.3
Currituck	84.4	.	4.1	4.1	80.3	Robeson	318.1	.	0.9	0.9	317.2
Dare	161.1	.	.	.	161.1	Rockingham	243.9	.	0.3	0.3	243.6
Davidson	179.0	1.0	0.2	1.2	177.8	Rowan	138.4	.	0.8	0.8	137.6
Davie	74.9	.	.	.	74.9	Rutherford	255.7	.	0.3	0.3	255.4
Duplin	339.0	.	7.7	7.7	331.3	Sampson	395.1	.	0.1	0.1	395.0
Durham	115.9	.	6.5	6.5	109.4	Scotland	106.8	.	26.2	26.2	80.6
Edegcombe	160.5	.	0.8	0.8	159.7	Stanly	107.4	.	(1)	(1)	107.4
Forsyth	133.7	.	1.2	1.2	132.5	Stokes	179.1	.	(1)	(1)	179.1
Franklin	185.0	.	(1)	(1)	185.0	Surry	193.5	.	0.6	0.6	192.9
Gaston	122.5	.	0.4	0.4	122.1	Swain	114.8	15.8	30.5	46.3	68.5
Gates	162.8	.	.	.	162.8	Transylvania	212.3	83.4	0.7	84.1	128.2
Graham	172.7	104.9	2.2	107.1	65.6	Tyrrell	216.9	.	.	.	216.9
Granville	228.0	.	13.5	13.5	214.5	Union	197.2	.	0.2	0.2	197.0
Greene	82.4	.	.	.	82.4	Vance	95.8	.	6.5	6.5	89.3
Guilford	191.8	.	4.8	4.8	187.0	Wake	312.6	.	1.4	1.4	311.2
Halifax	273.0	.	2.2	2.2	270.8	Warren	193.6	.	0.8	0.8	192.8
Harnett	244.0	.	(1)	(1)	244.0	Washington	142.9	.	1.8	1.8	141.1
Haywood	193.4	52.7	7.7	60.4	133.0	Watauga	121.1	0.4	0.2	0.6	120.5
Henderson	161.5	18.1	.	18.1	143.4	Wayne	157.8	.	1.5	1.5	156.3
Hertford	149.4	.	0.1	0.1	149.3	Wilkes	365.8	.	6.2	6.2	359.6
Hoke	146.9	.	56.5	56.5	90.4	Wilson	113.3	.	0.7	0.7	112.6
Hyde	275.3	.	30.6	30.6	244.7	Yadkin	99.2	.	0.1	0.1	99.1
Iredell	157.1	.	0.3	0.3	156.8	Yancey	142.8	22.7	(1)	22.7	120.1
Jackson	267.2	26.4	17.6	44.0	223.2	Total	20,027.3	1,055.7	687.3	1,743.0	18,284.3
Johnston	261.4	.	0.6	0.6	260.8						

[1] Less than 50 acres.

Table 44. *Volume of sawtimber and growing stock, by county and species group, North Carolina, 1964*

County	Sawtimber					Growing stock				
	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					*Thousand cords*				
Alamance	316.6	140.7	4.0	52.5	119.4	1,606	772	19	333	482
Alexander	70.8	20.6	.	8.3	41.9	571	158	7	117	289
Alleghany	165.9	3.1	5.7	43.5	113.6	714	33	22	193	466
Anson	457.2	265.6	.	67.7	123.9	2,351	1,400	7	383	561
Ashe	397.1	11.4	29.5	70.9	285.3	1,892	111	146	434	1,201
Avery	297.8	2.2	36.4	96.2	163.0	1,594	10	142	532	910
Beaufort	1,321.1	806.4	46.0	349.6	119.1	5,126	2,873	102	1,663	488
Bertie	2,184.8	1,061.2	135.7	695.4	292.5	7,507	3,044	292	2,911	1,260
Bladen	1,037.9	570.5	29.2	319.9	118.3	4,207	2,189	69	1,451	498
Brunswick	598.6	311.0	52.7	149.5	85.4	3,053	1,556	198	889	410
Buncombe	849.1	59.1	41.6	153.9	594.5	3,723	302	153	769	2,499
Burke	546.6	99.4	131.5	58.3	257.4	2,990	778	449	427	1,336
Cabarrus	176.0	34.9	8.3	33.3	99.5	945	290	45	171	439
Caldwell	582.7	99.5	135.4	101.6	246.2	3,002	626	457	585	1,334
Camden	579.0	317.0	30.5	204.4	27.1	1,977	820	97	927	133
Carteret	384.0	288.2	24.1	68.3	3.4	1,708	1,158	51	442	57
Caswell	376.4	161.9	1.2	85.6	127.7	2,097	991	11	480	615
Catawba	239.3	100.4	.	43.8	95.1	1,127	478	7	195	447
Chatham	739.7	291.0	10.3	178.3	260.1	4,276	1,796	50	1,010	1,420
Cherokee	540.0	163.5	26.4	88.8	261.3	2,762	878	91	471	1,322
Chowan	401.9	284.1	.	65.6	52.2	1,501	890		350	261
Clay	236.2	20.0	1.3	22.4	192.5	1,049	82	3	116	848
Cleveland	187.4	95.4	.	37.8	54.2	1,163	643	8	200	312
Columbus	1,012.6	373.0	36.4	423.6	179.6	4,280	1,593	126	1,914	647
Craven	998.2	524.9	52.9	286.7	133.7	4,018	1,997	117	1,333	571
Cumberland	447.2	303.4	18.2	82.7	42.9	2,334	1,438	57	563	276
Currituck	403.5	224.4	20.5	118.2	40.4	1,659	726	46	722	165
Dare	348.6	235.5	48.5	56.2	8.4	1,380	776	189	370	45
Davidson	346.6	95.8	1.0	93.2	156.6	2,236	795	33	596	812
Davie	152.7	24.1	1.2	53.9	73.5	824	237	11	246	330
Duplin	891.2	484.6	.	290.4	116.2	3,869	1,947		1,421	501
Durham	294.5	89.9	.	97.9	106.7	1,361	455	6	439	461
Edgecombe	880.1	454.9	18.5	278.1	128.6	3,308	1,656	47	1,070	535
Forsyth	298.0	93.0	1.1	83.7	120.2	1,745	630	15	486	614
Franklin	592.7	377.1	.	99.8	115.8	2,532	1,426	2	541	563
Gaston	305.5	153.9	.	64.5	87.1	1,378	691	2	335	350
Gates	838.1	480.4	69.8	216.0	71.9	3,401	1,349	193	1,591	268
Graham	594.8	78.0	80.7	142.4	293.7	2,550	345	235	630	1,340
Granville	597.1	324.7	0.7	125.0	146.7	3,111	1,564	12	769	766
Greene	405.5	260.8	8.2	96.4	40.1	1,483	809	29	420	225
Guilford	453.9	157.9	1.0	126.3	168.7	2,089	820	16	326	727
Halifax	941.1	463.1	5.9	277.6	194.5	4,520	1,941	10	1,512	1,057
Harnett	325.8	146.9	.	92.3	86.6	1,647	682		519	446
Haywood	488.6	19.8	22.2	131.7	314.9	2,284	95	132	667	1,390
Henderson	617.9	39.4	95.6	94.2	388.7	2,659	202	276	476	1,705
Hertford	919.1	472.7	57.7	269.4	119.3	3,516	1,577	137	1,128	674
Hoke	394.4	291.0	19.3	73.2	10.9	1,465	954	51	388	72
Hyde	614.1	347.4	74.0	181.3	11.4	2,701	1,320	198	1,097	86
Iredell	337.4	141.2	2.9	54.0	139.3	1,875	845	30	374	626
Jackson	663.3	12.5	73.9	137.5	439.4	3,124	73	207	794	2,050
Johnston	1,063.5	593.3	.	337.1	133.1	4,346	2,126		1,427	793

Table 44. *Volume of sawtimber and growing stock, by county and species group, North Carolina, 1964* (Continued)

County	Sawtimber					Growing stock				
	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					*Thousand cords*				
Jones	520.5	208.7	17.6	210.1	84.1	2,195	1,030	33	802	330
Lee	235.6	116.9	.	40.9	77.8	1,320	561		269	490
Lenoir	438.5	266.8	16.4	93.6	61.7	1,810	1,049	40	417	304
Lincoln	180.3	69.8	1.2	31.8	77.5	940	396	2	185	357
McDowell	570.9	103.2	25.8	72.5	369.4	2,914	589	80	419	1,826
Macon	812.6	44.1	100.0	135.8	532.7	3,597	229	313	791	2,264
Madison	601.7	28.5	98.0	134.3	340.9	2,941	218	305	720	1,698
Martin	1,188.7	591.2	51.4	444.4	101.7	4,082	1,849	111	1,715	407
Mecklenburg	322.1	102.3	1.0	82.1	136.7	1,477	589	33	316	539
Mitchell	243.9	1.4	26.4	65.7	150.4	1,434	6	113	493	822
Montgomery	443.5	236.2	0.1	46.0	161.2	2,780	1,437	4	347	992
Moore	739.2	328.6	53.8	204.2	152.6	4,228	1,853	143	1,275	957
Nash	970.7	592.9	32.0	160.0	185.8	3,490	1,893	65	795	737
New Hanover	93.5	79.6	1.8	9.2	2.9	509	324	7	136	42
Northampton	818.8	348.4	44.8	247.7	177.9	3,202	1,095	119	1,234	754
Onslow	847.7	596.7	2.7	193.5	54.8	3,406	2,135	6	963	302
Orange	424.5	179.4	1.2	94.7	149.2	2,174	852	20	581	721
Pamlico	479.9	288.1	20.1	128.2	43.5	2,040	1,047	48	730	215
Pasquotank	579.7	350.4	60.6	146.1	22.6	2,051	1,053	157	735	106
Pender	926.6	544.8	73.5	161.3	147.0	4,855	2,801	222	1,141	691
Perquimans	566.5	219.4	44.8	198.7	103.6	2,141	784	121	850	386
Person	368.7	159.1	4.2	82.8	122.6	2,012	873	37	492	610
Pitt	1,080.6	595.9	55.8	339.0	89.9	3,993	1,740	145	1,676	432
Polk	177.0	52.4	10.1	28.4	86.1	963	355	26	162	420
Randolph	522.3	195.2	7.1	61.0	259.0	3,478	1,331	45	539	1,563
Richmond	420.1	225.2	.	163.0	31.9	2,133	1,097		845	191
Robeson	1,175.4	494.8	54.1	501.3	125.2	4,714	1,608	127	2,540	439
Rockingham	295.8	66.4	.	109.4	120.0	2,033	829	5	537	662
Rowan	404.2	148.0	5.2	102.8	148.2	1,866	787	27	421	631
Rutherford	300.0	132.4	1.9	36.9	128.8	2,063	1,035	6	216	806
Sampson	868.3	470.6	13.2	319.0	65.5	4,011	2,058	37	1,571	345
Scotland	240.2	188.4	6.1	33.1	12.6	1,054	774	19	206	55
Stanly	248.5	124.8	0.9	32.9	89.9	1,345	684	7	152	502
Stokes	327.1	92.0	1.4	62.2	171.5	2,001	679	4	500	818
Surry	255.4	100.4	4.0	42.3	108.7	1,894	734	17	347	796
Swain	242.5	34.3	6.2	34.5	167.5	1,277	264	22	173	818
Transylvania	806.5	48.2	69.4	167.2	521.7	3,439	219	215	774	2,231
Tyrrell	532.1	331.6	29.5	154.5	16.5	2,362	1,182	90	1,021	69
Union	288.0	114.6	1.9	51.3	120.2	1,802	783	11	289	719
Vance	194.5	97.9	.	52.5	44.1	1,130	640	2	280	208
Wake	822.0	362.9	.	269.8	189.3	3,964	1,768	4	1,219	973
Warren	441.3	190.0	.	104.1	147.2	2,290	974	6	578	732
Washington	427.7	216.3	26.2	162.7	22.5	1,850	697	94	905	154
Watauga	276.2	[1]	85.5	57.5	133.2	1,387	[1]	220	397	770
Wayne	719.0	580.7	.	108.9	29.4	2,625	1,940		502	183
Wilkes	770.1	220.2	109.9	118.8	321.2	4,841	1,607	429	895	1,910
Wilson	482.4	318.8	5.4	129.0	29.2	1,875	977	20	639	239
Yadkin	270.8	162.3	.	19.5	89.0	1,419	848		148	423
Yancey	459.2	[1]	120.8	84.8	253.6	1,913	[1]	318	429	1,166
Total	54,333.4	23,491.5	2,752.0	13,708.9	14,381.0	247,956	99,220	8,478	70,770	69,488

[1] Negligible.

Table 45. *Annual cut of growing stock and sawtimber, by county, North Carolina, 1963*

County	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million cubic feet			*Million board feet*		
Alamance	7.2	4.8	2.4	18.0	10.0	8.0
Alexander	4.8	4.1	0.7	10.7	8.8	1.9
Alleghany	1.5	0.5	1.0	5.0	1.0	4.0
Anson	11.6	9.7	1.9	38.3	31.2	7.1
Ashe	2.0	0.6	1.4	8.7	2.5	6.2
Avery	1.5	0.2	1.3	5.5	1.2	4.3
Beaufort	13.5	7.4	6.1	42.7	29.2	13.5
Bertie	12.6	3.4	9.2	40.9	14.3	26.6
Bladen	19.0	7.7	11.3	73.8	34.4	39.4
Brunswick	12.0	9.1	2.9	50.4	40.4	10.0
Buncombe	2.0	0.2	1.8	6.4	0.4	6.0
Burke	5.6	4.0	1.6	14.1	10.0	4.1
Cabarrus	6.4	3.1	3.3	20.1	11.5	8.6
Caldwell	5.5	3.1	2.4	16.0	8.5	7.5
Camden	1.9	0.8	1.1	4.5	1.7	2.8
Carteret	2.8	2.4	0.4	8.2	7.2	1.0
Caswell	7.5	1.5	6.0	14.6	2.6	12.0
Catawba	2.8	1.5	1.3	8.2	3.1	5.1
Chatham	15.8	11.5	4.3	49.3	35.8	13.5
Cherokee	6.1	3.7	2.4	12.1	5.6	6.5
Chowan	3.1	0.9	2.2	9.4	3.6	5.8
Clay	0.7	(1)	0.7	3.0	.	3.0
Cleveland	9.7	8.8	0.9	25.6	22.6	3.0
Columbus	16.8	7.8	9.0	65.4	34.9	30.5
Craven	6.7	4.4	2.3	24.7	17.3	7.4
Cumberland	4.7	3.6	1.1	18.0	14.5	3.5
Currituck	2.9	2.0	0.9	11.1	8.0	3.1
Dare	0.1	0.1	.	.	.	.
Davidson	9.1	5.3	3.8	28.8	13.7	15.1
Davie	1.3	1.2	0.1	2.5	1.9	0.6
Duplin	11.1	7.0	4.1	47.2	33.8	13.4
Durham	7.2	3.7	3.5	23.5	8.6	14.9
Edgecombe	8.6	3.2	5.4	23.8	12.3	11.5
Forsyth	3.7	1.7	2.0	11.3	6.4	4.9
Franklin	12.5	7.2	5.3	29.7	15.7	14.0
Gaston	4.1	3.4	0.7	9.2	7.1	2.1
Gates	6.8	4.1	2.7	19.5	14.6	4.9
Graham	1.5	0.2	1.3	5.8	0.8	5.0
Granville	10.5	6.6	3.9	32.3	22.6	9.7
Greene	4.5	3.2	1.3	20.6	15.5	5.1
Guilford	9.9	6.0	3.9	28.3	15.9	12.4
Halifax	10.2	2.3	7.9	30.7	7.9	22.8
Harnett	7.8	3.8	4.0	30.2	17.4	12.8
Haywood	2.6	0.1	2.5	6.7	.	6.7
Henderson	4.5	1.5	3.0	15.9	5.1	10.8
Hertford	11.0	5.4	5.6	38.7	21.5	17.2
Hoke	3.8	2.0	1.8	13.8	7.4	6.4
Hyde	6.4	3.0	3.4	21.7	12.8	8.9
Iredell	6.3	2.2	4.1	21.1	7.6	13.5
Jackson	3.6	0.4	3.2	14.3	1.2	13.1
Johnston	10.8	6.3	4.5	43.6	28.0	15.6
Jones	6.5	4.1	2.4	25.8	18.2	7.6
Lee	3.6	1.7	1.9	12.6	6.1	6.5
Lenoir	3.4	2.2	1.2	14.6	10.3	4.3
Lincoln	3.8	2.4	1.4	10.4	6.1	4.3
McDowell	2.7	1.3	1.4	5.9	3.0	2.9
Macon	3.4	1.1	2.3	12.9	3.5	9.4
Madison	2.0	0.4	1.6	6.7	1.6	5.1
Martin	6.0	3.1	2.9	19.2	12.2	7.0
Mecklenburg	8.3	7.1	1.2	20.7	17.7	3.0
Mitchell	0.6	0.1	0.5	0.9	0.4	0.5
Montgomery	7.4	3.1	4.3	24.6	12.1	12.5
Moore	12.6	6.2	6.4	41.6	25.3	16.3
Nash	8.4	3.8	4.6	24.9	14.8	10.1
New Hanover	0.9	0.8	0.1	2.7	2.5	0.2
Northampton	17.5	7.0	10.5	51.2	22.3	28.9
Onslow	10.1	6.9	3.2	35.4	29.6	5.8
Orange	7.6	5.4	2.2	20.1	12.0	8.1
Pamlico	4.3	2.3	2.0	14.0	9.3	4.7
Pasquotank	0.6	0.6	.	2.7	2.7	.
Pender	8.0	5.9	2.1	30.3	22.8	7.5
Perquimans	3.0	1.6	1.4	9.4	6.9	2.5
Person	8.6	6.5	2.1	20.8	16.9	3.9
Pitt	8.9	3.1	5.8	30.4	13.9	16.5
Polk	4.7	4.1	0.6	12.7	11.0	1.7
Randolph	13.9	9.2	4.7	40.7	25.3	15.4
Richmond	6.3	4.4	1.9	24.6	17.7	6.9
Robeson	17.4	6.0	11.4	63.2	28.8	34.4
Rockingham	7.8	4.9	2.9	15.9	11.2	4.7
Rowan	7.1	2.6	4.5	21.8	7.8	14.0
Rutherford	11.7	7.4	4.3	28.0	16.5	11.5
Sampson	12.9	7.1	5.8	51.0	30.5	20.5
Scotland	2.5	1.7	0.8	9.0	6.2	2.8
Stanly	5.4	4.6	0.8	11.6	9.0	2.6
Stokes	3.9	2.2	1.7	9.1	6.7	2.4
Surry	8.1	4.5	3.6	17.9	10.2	7.7
Swain	1.1	0.9	0.2	1.2	0.9	0.3
Transylvania	3.0	1.1	1.9	11.1	4.1	7.0
Tyrrell	3.8	3.7	0.1	15.4	15.3	0.1
Union	3.8	2.9	0.9	6.0	5.0	1.0
Vance	4.2	3.4	0.8	13.4	10.1	3.3
Wake	14.0	11.1	2.9	46.0	35.2	10.8
Warren	10.6	7.2	3.4	30.4	20.0	10.4
Washington	5.7	2.0	3.7	15.8	7.3	8.5
Watauga	2.9	1.0	1.9	12.7	4.1	8.6
Wayne	8.7	4.8	3.9	37.2	23.7	13.5
Wilkes	7.7	4.0	3.7	19.0	10.5	8.5
Wilson	4.4	3.7	0.7	18.1	15.9	2.2
Yadkin	4.5	2.7	1.8	12.3	6.3	6.0
Yancey	2.0	0.6	1.4	8.1	2.8	5.3
Total	660.9	371.2	289.7	2,113.9	1,250.4	863.5

[1] Negligible.

Table 46. *Net annual growth of growing stock and sawtimber, by county, North Carolina, 1963*

County	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million cubic feet			*Million board feet*		
Alamance	5.4	3.4	2.0	17.7	10.6	7.1
Alexander	2.0	0.8	1.2	4.5	1.2	3.3
Alleghany	1.9	0.2	1.7	6.0	0.4	5.6
Anson	11.5	8.8	2.7	37.5	28.3	9.2
Ashe	6.3	1.1	5.2	15.0	2.3	12.7
Avery	5.5	0.7	4.8	11.3	1.4	9.9
Beaufort	13.3	7.8	5.5	46.7	36.0	10.7
Bertie	17.0	7.7	9.3	62.6	37.7	24.9
Bladen	16.3	10.7	5.6	59.1	37.7	21.4
Brunswick	13.9	10.8	3.1	37.0	32.6	4.4
Buncombe	10.7	2.1	8.6	35.8	6.5	29.3
Burke	9.8	4.8	5.0	25.4	14.3	11.1
Cabarrus	4.0	2.3	1.7	11.4	4.6	6.8
Caldwell	9.2	3.5	5.7	23.8	11.1	12.7
Camden	5.0	2.2	2.8	17.3	9.3	8.0
Carteret	4.2	3.3	0.9	12.5	11.5	1.0
Caswell	7.0	4.0	3.0	17.0	9.4	7.6
Catawba	3.9	2.0	1.9	9.9	4.3	5.6
Chatham	16.1	10.1	6.0	48.4	30.0	18.4
Cherokee	8.2	3.7	4.5	24.6	8.5	16.1
Chowan	4.2	2.3	1.9	15.7	11.2	4.5
Clay	2.7	0.4	2.3	8.5	0.9	7.6
Cleveland	5.0	3.6	1.4	14.0	9.7	4.3
Columbus	15.8	9.8	6.0	49.9	32.8	17.1
Craven	10.9	7.1	3.8	32.6	21.0	11.6
Cumberland	10.4	7.7	2.7	26.6	23.5	3.1
Currituck	4.2	1.7	2.5	12.0	8.3	3.7
Dare	2.7	1.7	1.0	5.9	4.7	1.2
Davidson	8.3	4.4	3.9	17.7	7.5	10.2
Davie	2.7	0.9	1.8	7.5	1.3	6.2
Duplin	14.8	8.7	6.1	53.4	38.3	15.1
Durham	4.4	2.3	2.1	14.1	7.9	6.2
Edgecombe	9.6	5.0	4.6	34.3	21.3	13.0
Forsyth	6.1	3.0	3.1	14.9	6.2	8.7
Franklin	9.4	6.3	3.1	34.4	25.9	8.5
Gaston	4.4	2.5	1.9	13.5	8.2	5.3
Gates	7.0	2.8	4.2	19.0	12.9	6.1
Graham	6.9	1.7	5.2	21.2	6 2	15.0
Granville	11.8	7.4	4.4	44.0	27.0	17.0
Greene	5.6	3.6	2.0	19.8	14.8	5.0
Guilford	5.8	2.6	3.2	20.9	7.4	13.5
Halifax	14.1	6.1	8.0	43.0	20.9	22.1
Harnett	6.9	4.1	2.8	17.5	10.2	7.3
Haywood	6.7	0.8	5.9	17.9	3.0	14.9
Henderson	6.5	1.3	5.2	25.5	6.0	19.5
Hertford	9.0	4.8	4.2	36.8	27.8	9.0
Hoke	5.3	4.0	1.3	19.1	15.4	3.7
Hyde	6.2	3.9	2.3	22.7	15.6	7.1
Iredell	7.6	4.5	3.1	19.6	11.3	8.3
Jackson	9.2	0.9	8.3	27.4	2.6	24 8
Johnston	16.1	9.1	7.0	51.3	38.4	12.9
Jones	8.5	6.0	2.5	27.3	21.2	6.1
Lee	5.3	2.8	2.5	26.6	16.4	10.2
Lenoir	8.1	5.6	2.5	30.9	27.4	3.5
Lincoln	3.4	1.9	1.5	8.6	4.1	4.5
McDowell	7.6	1.9	5.7	22.2	6.2	16.0
Macon	9.2	1.5	7.7	28.1	5.0	23.1
Madison	8.3	1.7	6.6	24.0	6.1	17.9
Martin	8.8	4.3	4.5	32.3	20.0	12.3
Mecklenburg	6.1	3.6	2.5	18.5	9.9	8.6
Mitchell	4.9	0.4	4.5	15.0	4.0	11.0
Montgomery	10.9	7.2	3.7	33.8	22.8	11.0
Moore	14.6	9.6	5.0	49.1	39.5	9.6
Nash	9.3	5.1	4.2	29.1	20.2	8.9
New Hanover	1.9	1.4	0.5	6.5	6.1	0.4
Northampton	8.3	3.0	5.3	24.4	15.6	8.8
Onslow	13.2	9.7	3.5	49.2	43.8	5.4
Orange	6.8	3.3	3.5	26.0	13.6	12.4
Pamlico	5.7	3.2	2.5	18.4	14.3	4.1
Pasquotank	4.5	2.8	1.7	18.1	14.1	4.0
Pender	18.5	13.9	4.6	88.4	61.1	27.3
Perquimans	5.1	2.7	2.4	13.5	8.6	4.9
Person	6.1	3.2	2.9	18.1	10.8	7.3
Pitt	10.5	5.2	5.3	35.6	24.5	11.1
Polk	3.7	2.0	1.7	10.3	5.9	4.4
Randolph	11.8	5.9	5.9	32.9	16.3	16.6
Richmond	8.5	5.6	2.9	29.6	21.1	8.5
Robeson	15.8	7.0	8.8	58.7	35.9	22.8
Rockingham	7.9	4.3	3.6	19.5	7.2	12.3
Rowan	5.5	3.0	2.5	23.1	12.6	10.5
Rutherford	8.8	5.6	3.2	21.4	13.7	7.7
Sampson	16.3	10.6	5.7	58.5	43.5	15.0
Scotland	4.5	3.6	0.9	25.1	20.8	4.3
Stanly	3.7	2.3	1.4	13.0	7.5	5.5
Stokes	7.8	3.8	4.0	17.5	4.7	12.8
Surry	8.4	4.0	4.4	13.7	7.4	6.3
Swain	3.6	1.1	2.5	8.9	3.0	5.9
Transylvania	9.2	1.3	7.9	30.1	5.0	25.1
Tyrrell	6.4	3.7	2.7	16.0	11.1	4.9
Union	6.3	3.5	2.8	17.1	10.0	7.1
Vance	6.2	4.7	1.5	14.1	10.5	3.6
Wake	16.1	10.9	5.2	61.1	41.6	19.5
Warren	10.3	6.5	3.8	31.1	18.8	12.3
Washington	6.6	2.7	3.9	20.1	11.5	8.6
Watauga	4.8	0.6	4.2	9.4	2.9	6.5
Wayne	10.3	8.0	2.3	42.4	33.5	8.9
Wilkes	15.1	6.7	8.4	46.7	22.5	24.2
Wilson	6.4	3.3	3.1	23.4	15.9	7.5
Yadkin	4.6	3.0	1.6	14.8	9.4	5.4
Yancey	6.4	0.9	5.5	18.8	3.7	15.1
Total	812.1	429.6	382.5	2,605.2	1,557.2	1,048.0

WOOD · WATER · FORAGE · WILDLIFE · RECREATION
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

U. S. Forest Service Resource Bulletin SE-6 December 1967

Deer Browse Resources of the Atomic Energy Commission's Savannah River Project Area

by

William H. Moore

CLEMSON UNIVERSITY LIBRARY
MAY
S.C. TECH. & AGR. DIV.

U.S. Department of Agriculture-Forest Service
Southeastern Forest Experiment Station
Asheville, North Carolina

Deer Browse Resources of the Atomic Energy Commission's Savannah River Project Area

by

William H. Moore

Wildlife Biologist

A procedure developed in Georgia[1,2] was used to inventory the browse resources of the Atomic Energy Commission's Savannah River Project Area near Aiken, South Carolina.[3] Through this procedure, the forest land manager is supplied with relative carrying capacity data for deer. If silvical practices can be related to habitat quality and quantity, he can adjust management procedures to improve wildlife habitat as well as timber.

The 200,831-acre Savannah River Project Area is located in Aiken, Barnwell, and Allendale Counties, a section of the Atlantic Upper Coastal Plain just south of the "fall line" known as the sandhills. Topography is rolling and deep sandy soils predominate. Two major drainages run through the area and flow into the Savannah River, which runs along the area's southwestern boundary. Approximately 33 percent of the area was under cultivation prior to establishment of the Project during the early 1950's.

Table 1.--Acreage distribution by land class, AEC, Savannah River Project Area

Land class	Acres
Forest lands sampled	172,563
Forest lands not sampled[1]	7,501
Total forest lands	180,064
Nonforest lands, usable by wildlife	6,646
Total usable wildlife habitat	186,710
Other lands	14,121
Total land area	200,831

[1]These are baldcypress-tupelo sites of the Savannah River Bottom not sampled because of high water.

Presently, the Project Area includes 186,710 acres of usable wildlife habitat (table 1). Of this, 180,064 acres are classed as forest lands, with the remainder being primarily open fields and rights-of-way. The additional 14,121 acres include building sites, water surfaces, and other areas unavailable or nonusable by wildlife.

[1]Moore, William H., Ripley, Thomas H., and Clutter, Jerome L. Trials to determine relative deer range carrying capacity values in connection with the Georgia Forest Survey. Fourteenth Annu. Conf. Southeast. Assoc. Game and Fish Commrs. Proc. 1960: 98-104. 1960.

[2]Ripley, Thomas H., and McClure, Joe P. Deer browse resources of north Georgia. Southeast. Forest Exp. Sta., U. S. Forest Serv. Resource Bull. SE-2, 20 pp. 1963.

[3]This study was conducted by the Southeastern Forest Experiment Station in cooperation with the Savannah River Project of the Atomic Energy Commission and the National Forests in South Carolina.

A description of major types sampled in the area follows:

1. Pine plantations.--Longleaf, slash, and loblolly pines planted mostly in old field sites, but including some direct seeding of longleaf in scrub oak sites. Approximately 4,000 acres were planted by private landowners prior to acquisition by the Atomic Energy Commission. The balance was planted or seeded since 1952.

2. Longleaf pine (natural).--Longleaf pine predominates. On drier sites, common associates are turkey oak, blackjack oak, bluejack oak, scarlet oak, and dwarf post oak. In the branch heads, loblolly pine, hickories, sweetgum, and southern red oak occur.

3. Loblolly pine (natural).--Principal associates are sweetgum, oaks, and hickories on well-drained sites, and spruce pine, yellow-poplar, shortleaf pine, blackgum, and water oak on the poorly drained sites.

4. Longleaf-scrub oak.--These dry sites contain mainly turkey oak, blackjack oak, bluejack oak, scarlet oak, and dwarf post oak, associated with remnants of the former longleaf pine stand.

5. Loblolly-scrub hardwoods.--These are fairly fertile moist sites, with a mixture of water oak, willow oak, blackjack oak, post oak, persimmon, hickories, and blackgum. This type occupies mostly former loblolly pine and loblolly pine-hardwood sites.

6. Pine-hardwoods.--Loblolly pine is the key species and occupies at least 25 percent of the stand. It is associated with a wide variety of moist site hardwoods, such as sweetgum, yellow-poplar, sweetbay, blackgum, swamp white oak, swamp chestnut oak, and cherrybark oak.

7. Bottomland hardwoods.--This type includes a wide variety of wet sites, the bulk of which occurs along the Upper and Lower Three Runs Drainages and the Savannah River Bottom. Common species are swamp chestnut oak, swamp white oak, cherrybark oak, sweetgum, blackgum, yellow-poplar, red maple, green ash, sycamore, black willow, and cottonwood.

Methods

Fifteen overstory characteristics were chosen as strata for sampling, using existing continuous forest inventory plot data. Each stratum (table 2) was sampled at 20 to 30 locations each for a total of 380 locations, or 3,800 plot samples. Sampling was done during the 3-month period, December 1963 through February 1964.

Table 2.--List of overstory classes sampled showing codes and number of locations in each class

Overstory class	Code number	Locations
		Number
I. Plantations (longleaf, slash, loblolly)		
A. Nonthinned		
1. 0-6 years old	01	30
2. 6+ years old	02	30
B. Thinned (6+ years old)	03	30
II. Natural stands		
A. Longleaf pine	10	30
B. Longleaf-scrub oak	20	20
C. Loblolly pine		
1. Seedlings and saplings	31	30
2. Poletimber and sawtimber	32	30
D. Loblolly-scrub hardwoods	40	30
E. Pine-hardwoods	50	30
F. Bottomland hardwoods		
1. Below 200 feet elevation (Savannah River Bottom)		
a. Seedlings and saplings	81	20
b. Poletimber and sawtimber	82	20
2. Above 200 feet elevation		
a. Upper Three Runs Drainage		
1. Seedlings and saplings	83	20
2. Poletimber and sawtimber	84	20
b. Lower Three Runs Drainage		
1. Seedlings and saplings	85	20
2. Poletimber and sawtimber	86	20
Total		380

Three specific attributes of the browse resource--species occurrence, utilization by deer, and browse weight--were measured on a cylindrical plot, 1 milacre in area and $4\frac{1}{2}$ feet high, at each of 10 systematically arranged points for each sample location. At each point, all woody plants within the plot were recorded by species (up to 10), and each species was assigned one of the four browse preference rankings:

Desirables

1. Preferred--Delicacies or "candy" species. These are usually highly nutritive and are the first species consumed by deer.

2. Staple--Foundation or "bread and butter" species. These constitute the bulk of deer diet on good range. They are high in nutritive value and provide for normal animal weight gain and reproduction.

Undesirables

3. Emergency--Life-sustaining species. These provide a large part of the diet on overstocked ranges. They are generally low in nutritive value and produce little or no animal weight gain, and animal reproduction is usually low.

4. Stuffing--Starvation species. These plants have little or no food value. Animals continually lose weight and animal reproduction is very low, if they are a major part of the diet. Some may even be toxic.

Browse weight of each species was then estimated and the presence or absence of use by deer was recorded. Weight of browse present in the cylindrical plot in terms of pounds of dry browse per acre available during the winter period was estimated with the aid of photograph standards (see footnote 2). Estimates were made to the nearest 10 pounds per acre. Control checks of estimates were made by clipping at least two plots weekly, but more often when needed, to maintain crew accuracy of estimates within 10 percent of clipped weights. The total number of woody species occurring in each plot was also recorded.

In addition, three overstory variables were measured from each plot: (1) Basal area, (2) height of the nearest dominant tree, and (3) species of the dominant tree. All plot data were summarized by preference class, averaged for the location, and viewed as a single observation (cluster sample). Frequency of occurrence, percent utilization, and browse weights were examined for differences between major types, stand sizes, age classes, and various type combinations by standard analyses of variance computations. Characteristics of the understory and the overstory were examined for significant relationships. Basal area, overstory height, and time of survey were used as independent variables in standard multiple regression analyses.

Results and Discussion

The multiple regression analyses of various expressions of basal area, height, time of survey, and transformations thereof (X variables) in combination with frequency occurrence, weight, and degree of use of the various browse classes (Y variables) yielded no significant or meaningful relationships. These same understory observations were examined for differences between various combinations of overstory attributes by analysis of variance. These results, as expected, were meaningful, and are presented in the appendix, together with probability statements and confidence limits.

Summaries of plant occurrence, browse weight, and degree of use are shown in tables 3, 4, and 5. Generally speaking, the better sites contained more desirable species and greater weight of desirable browse. For example, the bottomland sites contained many more desirable species than the drier upland sites. Desirable plants, however, occurred less frequently in plantations than in natural stands. A similar pattern existed for desirable browse weight.

Overall, very little browse utilization was in evidence on the Project Area. Nevertheless, some use was noted throughout the area, particularly in the bottomlands and adjacent sites. Apparently, higher browsing pressure and more favorable browse supplies are both associated with the better hardwood sites.

It has been assumed that approximately 625 pounds of desirable browse are required to support an average white-tailed deer over winter (see footnote 2). By using browse weights shown in table 4, the approximate carrying capacity values for the overstory classes sampled were calculated and are shown in table 6. Based on these figures, the approximate carrying capacity for the area would be between 5,000 to 6,000 animals. This, of course, does not include other foodstuffs, such as mast or dry fallen leaves, or old field and roadside greeneries, such as winter rosettes and Japanese honeysuckle. The latter is especially abundant and actual optimum carrying capacity may be more like 8,000 to 10,000 animals.

Table 3.--Percent of plots on which browse plants occurred by preference and overstory classes sampled

Overstory class	Browse preference class						Total (All classes)
	Preferred	Staple	Emergency	Stuffing	Desirable[1]	Undesirable[2]	
	Percent						
I. Plantations (longleaf, slash, loblolly)	7	13	45	50	20	80	84
A. Nonthinned	3	9	36	56	12	79	81
1. 0-6 years old	3	8	37	69	11	87	89
2. 6+ years old	3	10	36	41	13	70	72
B. Thinned (6+ years old)	14	21	62	39	35	81	89
II. Natural stands							
A. Longleaf pine	23	24	72	51	46	88	93
B. Longleaf-scrub oak	8	34	97	33	42	98	99
C. Loblolly pine	18	41	76	56	53	91	95
1. Seedlings and saplings	9	42	79	51	51	92	95
2. Poletimber and sawtimber	28	39	72	62	55	91	95
D. Loblolly-scrub hardwoods	25	50	85	46	64	94	97
E. Pine-hardwoods	33	78	95	57	87	97	100
F. Bottomland hardwoods	49	79	90	60	91	98	100
1. Below 200 feet elevation (Savannah River Bottom)	60	70	91	60	91	96	100
a. Seedlings and saplings	55	70	90	59	89	95	100
b. Poletimber and sawtimber	65	71	92	62	94	98	100
2. Above 200 feet elevation							
a. Upper Three Runs Drainage	44	89	89	56	95	98	100
1. Seedlings and saplings	41	88	86	48	94	97	100
2. Poletimber and sawtimber	47	89	92	64	95	99	100
b. Lower Three Runs Drainage	44	77	90	63	87	98	100
1. Seedlings and saplings	46	73	90	62	87	98	100
2. Poletimber and sawtimber	42	81	90	64	88	99	100

[1]Desirable = Preferred or Staple.
[2]Undesirable = Emergency or Stuffing.

Table 4.--Weight of browse by preference class for overstory class sampled

Overstory class	Browse preference class						Total
	Preferred	Staple	Emergency	Stuffing	Desirable[1]	Undesirable[2]	
	Pounds per acre						
I. Plantations (longleaf, slash, loblolly)	6	4	8	33	10	41	51
A. Nonthinned	7	4	5	47	11	52	63
1. 0-6 years old	2	4	6	72	6	78	84
2. 6+ years old	13	3	5	22	16	27	43
B. Thinned (6+ years old)	4	6	12	4	10	16	26
II. Natural stands							
A. Longleaf pine	3	5	6	29	8	35	43
B. Longleaf-scrub oak	6	4	24	62	10	86	96
C. Loblolly pine	6	6	9	14	12	23	35
1. Seedlings and saplings	3	8	10	13	11	23	34
2. Poletimber and sawtimber	9	5	8	15	14	23	37
D. Loblolly-scrub hardwoods	46	8	15	48	54	63	117
E. Pine-hardwoods	10	11	20	31	21	51	72
F. Bottomland hardwoods	24	35	21	40	59	61	120
1. Below 200 feet elevation (Savannah River Bottom)	15	22	13	21	37	34	71
a. Seedlings and saplings	20	41	8	15	61	23	84
b. Poletimber and sawtimber	11	2	17	26	13	43	56
2. Above 200 feet elevation							
a. Upper Three Runs Drainage	25	66	30	76	91	106	197
1. Seedlings and saplings	23	114	17	122	137	139	276
2. Poletimber and sawtimber	26	18	42	31	44	73	117
b. Lower Three Runs Drainage	32	16	20	22	48	42	90
1. Seedlings and saplings	51	15	22	18	66	40	106
2. Poletimber and sawtimber	13	16	17	26	29	43	72

[1]Desirable = Preferred + Staple.
[2]Undesirable = Emergency + Stuffing.

Table 5.--Percent of browse plants used for each preference class and overstory class sampled

Overstory class	Browse preference class						Total
	Preferred	Staple	Emergency	Stuffing	Desirable[1]	Undesirable[2]	
	Percent						
I. Plantations (longleaf, slash, loblolly)	Tr.[3]	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.
A. Nonthinned	0	Tr.	0	0	Tr.	0	Tr.
1. 0-6 years old	0	0	0	0	0	0	0
2. 6+ years old	0	Tr.	0	0	Tr.	0	Tr.
B. Thinned (6+ years old)	Tr.	0	Tr.	Tr.	Tr.	Tr.	Tr.
II. Natural stands							
A. Longleaf pine	2	Tr.	0	0	1	0	Tr.
B. Longleaf-scrub oak	Tr.	0	0	0	Tr.	0	Tr.
C. Loblolly pine	Tr.	Tr.	Tr.	0	Tr.	Tr.	Tr.
1. Seedlings and saplings	0	Tr.	Tr.	0	Tr.	Tr.	Tr.
2. Poletimber and sawtimber	Tr.	Tr.	Tr.	0	Tr.	Tr.	Tr.
D. Loblolly-scrub hardwoods	2	1	Tr.	0	2	Tr.	1
E. Pine-hardwoods	7	Tr.	Tr.	Tr.	3	Tr.	2
F. Bottomland hardwoods	1	Tr.	Tr.	Tr.	1	Tr.	1
1. Below 200 feet elevation (Savannah River Bottom)	6	Tr.	Tr.	Tr.	3	Tr.	2
a. Seedlings and saplings	1	Tr.	Tr.	0	1	Tr.	1
b. Poletimber and sawtimber	13	Tr.	1	1	7	1	4
2. Above 200 feet elevation							
a. Upper Three Runs Drainage	Tr.	Tr.	Tr.	0	Tr.	Tr.	Tr.
1. Seedlings and saplings	Tr.	Tr.	Tr.	0	0	0	Tr.
2. Poletimber and sawtimber	Tr.	Tr.	Tr.	0	Tr.	Tr.	Tr.
b. Lower Three Runs Drainage	Tr.	Tr.	Tr.	Tr.	1	Tr.	1
1. Seedlings and saplings	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	1
2. Poletimber and sawtimber	1	Tr.	1	Tr.	1	Tr.	1

[1]Desirable = Preferred + Staple.
[2]Undesirable = Emergency + Stuffing.
[3]Less than 0.5 percent used.

Table 6.--Computed carrying capacity values for overstory classes sampled

Overstory class	Acres per deer	Area				Computed carrying capacity (Area ÷ acres per deer)			
		Acres				Number of deer			
I. Plantations (longleaf, slash, loblolly)	57	69,880				1,236			
A. Nonthinned	56		65,880				1,171		
1. 0-6 years old	104			32,421				312	
2. 6+ years old	39			33,459				859	
B. Thinned (6+ years old)	62		4,000				65		
II. Natural stands	26	102,683				4,017			
A. Longleaf pine	78		14,142				181		
B. Longleaf-scrub oak	62		19,066				308		
C. Loblolly pine	48		29,423				610		
1. Seedlings and saplings	57			9,491				167	
2. Poletimber and sawtimber	45			19,932				443	
D Loblolly-scrub hardwoods	12		8,293				691		
E Pine-hardwoods	30		4,123				137		
F. Bottomland hardwoods	13		27,636				2,090		
1. Below 200 feet elevation (Savannah River Bottom)	33			7,703				230	
a. Seedlings and saplings	10				884				88
b. Poletimber and sawtimber	48				6,819				142
2 Above 200 feet elevation	11			19,933				1,860	
a. Upper Three Runs Drainage	9				14,168				1,526
1. Seedlings and saplings	5					3,993			799
2. Poletimber and sawtimber	14					10,175			727
b. Lower Three Runs Drainage	17				5,765				334
1. Seedlings and saplings	9					1,096			122
2. Poletimber and sawtimber	20					4,669			212
Total (sampled area)		172,563				5,253			

Table 7.--Frequency distribution, utilization, and weight of deer browse resources by preference class for natural upland and bottomland stands

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Upland (10, 20, 31, 32, 40, 50)[2] (n 170)		Bottomland (81, 82, 83, 84, 85, 86) (n=120)		Probability of a difference	Upland (10, 20, 31, 32, 40, 50) (n=170)		Bottomland (81, 82, 83, 84, 85, 86) (n-120)		Probability of a difference	Upland (10, 20, 31, 32, 40, 50) (n=170)		Bottomland (81, 82, 83, 84, 85, 86) (n 120)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	21	(17 to 26)	49	(42 to 56)	99.5	1	(0 to 3)	1	(1 to 3)	n.s.	13	(0 to 26)	24	(10 to 38)	n.s.
2	45	(39 to 51)	79	(74 to 84)	99.5	Tr.		Tr.		--	7	(5 to 8)	35	(2 to 67)	95.0
Desirable	59	(53 to 65)	91	(88 to 95)	99.5	1	(0 to 1)	1	(0 to 2)	n.s.	20	(7 to 33)	59	(23 to 94)	97.5
3	84	(80 to 88)	90	(87 to 93)	97.5	Tr.		Tr.		--	13	(10 to 16)	21	(15 to 26)	97.5
4	51	(47 to 55)	60	(54 to 66)	97.5	Tr.		Tr.		--	31	(13 to 50)	40	(15 to 64)	n.s.
Undesirable	94	(92 to 96)	98	(96 to 99)	99.5	Tr.		Tr.		--	44	(26 to 63)	61	(35 to 86)	n.s.
Total	97	(95 to 98)	100	(99 to 100)	99.5	Tr.		1	(0 to 1)	90.0	64	(47 to 96)	120	(78 to 164)	95.0

[1] See text for browse class explanation.
[2] Forest types included, see text.
n = Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 8.--Frequency distribution, utilization, and weight of deer browse resources by preference class for natural pine, pine-hardwoods, and bottomland stands

Browse[1] preference class	Distribution of plots occupied							Distribution of browse classes utilized							Browse weight						
	Natural pine (10, 31, 32)[2] (n = 90)		Pine-hardwoods (50) (n = 30)		Bottomland (81, 82, 83, 84, 85, 86) (n = 120)		Probability of a difference	Natural pine (10, 31, 32) (n = 90)		Pine-hardwoods (50) (n = 30)		Bottomland (81, 82, 83, 84, 85, 86) (n = 120)		Probability of a difference	Natural pine (10, 31, 32) (n = 90)		Pine-hardwoods (50) (n = 30)		Bottomland (81, 82, 83, 84, 85, 86) (n = 120)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent							Percent							Pounds per acre						Percent
1	19	(13 to 26)	33	(21 to 48)	49	(42 to 56)	99.5	Tr.		7	(1 to 20)	1	(1 to 3)	99.5	5	(3 to 7)	10	(2 to 18)	24	(10 to 38)	95.0
2	35	(27 to 43)	78	(67 to 88)	79	(74 to 84)	99.5	Tr.		Tr.		Tr.		--	6	(3 to 8)	11	(6 to 15)	35	(2 to 67)	n. s.
Desirable	51	(42 to 59)	87	(78 to 94)	91	(88 to 95)	99.5	Tr.		3	(1 to 6)	1	(0 to 2)	90.0	11	(7 to 14)	21	(10 to 32)	59	(23 to 94)	95.0
3	74	(67 to 81)	95	(89 to 98)	90	(87 to 93)	99.5	Tr		Tr.		Tr.		--	8	(6 to 10)	20	(10 to 31)	21	(15 to 26)	99.5
4	55	(50 to 59)	57	(46 to 68)	60	(54 to 66)	n. s	0		Tr.		Tr		--	19	(8 to 30)	31	(7 to 55)	40	(15 to 64)	n. s.
Undesirable	90	(87 to 94)	97	(94 to 99)	98	(96 to 99)	99.5	Tr.		Tr		Tr.		--	27	(16 to 38)	51	(25 to 77)	61	(35 to 86)	90.0
Total	94	(91 to 96)	100	(99 to 100)	100	(99 to 100)	99.5	Tr		2	(1 to 4)	1	(0 to 1)	99.5	38	(29 to 52)	72	(44 to 100)	120	(78 to 164)	99.5

[1] See text for browse class explanation.
[2] Forest types included, see text.
n = Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 9.--Frequency distribution, utilization, and weight of deer browse resources by preference class for bottomland sites

Browse[1] preference class	Distribution of plots occupied							Distribution of browse classes utilized							Browse weight						
	Savannah River Bottom (81, 82)[2] (n = 40)		Upper Three Runs Drainage (83, 84) (n = 40)		Lower Three Runs Drainage (85, 86) (n = 40)		Probability of a difference	Savannah River Bottom (81, 82) (n = 40)		Upper Three Runs Drainage (83, 84) (n = 40)		Lower Three Runs Drainage (85, 86) (n = 40)		Probability of a difference	Savannah River Bottom (81, 82) (n = 40)		Upper Three Runs Drainage (83, 84) (n = 40)		Lower Three Runs Drainage (85, 86) (n = 40)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent							Percent							Pounds per acre						Percent
1	60	(49 to 71)	44	(32 to 55)	44	(31 to 57)	90.0	6	(2 to 1)	Tr.		Tr.		99.5	15	(10 to 21)	25	(2 to 47)	32	(-5 to 69)	n. s.
2	70	(59 to 80)	89	(81 to 94)	77	(68 to 85)	99.0	Tr.		Tr.		Tr		--	22	(-9 to 52)	66	(-29 to 161)	16	(8 to 24)	n. s.
Desirable	91	(84 to 97)	95	(90 to 98)	87	(80 to 94)	n. s.	3	(1 to 6)	Tr.		1	(0 to 1)	99.0	37	(6 to 68)	91	(-6 to 188)	48	(10 to 86)	n. s.
3	91	(85 to 96)	89	(83 to 94)	90	(85 to 94)	n. s.	Tr.		Tr.		Tr		--	13	(9 to 17)	30	(15 to 44)	20	(14 to 25)	95.0
4	60	(49 to 71)	56	(46 to 66)	63	(52 to 73)	n. s.	Tr.		0		Tr		--	21	(4 to 37)	76	(3 to 150)	22	(14 to 29)	n. s.
Undesirable	96	(93 to 99)	98	(96 to 99)	98	(96 to 100)	n. s.	Tr.		Tr.		Tr		--	34	(17 to 50)	106	(31 to 180)	42	(32 to 51)	95.0
Total	100	(99 to 100)	100	(99 to 100)	100	(99 to 100)	n. s.	2	(1 to 4)	Tr.		1	(0 to 1)	99.0	71	(38 to 102)	197	(79 to 319)	90	(57 to 132)	95.0

[1] See text for browse class explanation.
[2] Forest types included, see text.
n = Number of locations.
Tr = Trace (less than 0.5 percent).

Table 10.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on all bottomland sites

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Seedlings and saplings (81, 83, 85)* (n 60)		Poletimber and sawtimber (82, 84, 86) (n-60)		Probability of a difference	Seedlings and saplings (81, 83, 85) (n-60)		Poletimber and sawtimber (82, 84, 86) (n-60)		Probability of a difference	Seedlings and saplings (81, 83, 85) (n-60)		Poletimber and sawtimber (82, 84, 86) (n-60)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	47	(38 to 56)	51	(41 to 62)	n.s.	Tr.		3	(1 to 6)	97.5	32	(5 to 58)	17	(7 to 26)	n.s.
2	78	(70 to 84)	81	(73 to 88)	n.s.	Tr.		Tr.		--	57	(-9 to 123)	12	(8 to 17)	n.s.
Desirable	90	(84 to 95)	93	(88 to 96)	n.s.	Tr.		2	(1 to 3)	95.0	89	(18 to 159)	29	(17 to 41)	90.0
3	89	(84 to 93)	91	(87 to 95)	n.s.	Tr.		Tr.		--	16	(11 to 20)	26	(16 to 35)	90.0
4	56	(47 to 65)	63	(55 to 71)	n.s.	Tr.		Tr.		--	52	(2 to 101)	28	(16 to 39)	n.s.
Undesirable	97	(94 to 98)	98	(97 to 100)	n.s.	Tr.		Tr.		--	68	(17 to 117)	54	(39 to 67)	n.s.
Total	100	(99 to 100)	100	(99 to 100)	n.s.	Tr.		1	(1 to 2)	97.5	158	(74 to 242)	83	(65 to 103)	90.0

[1]See text for browse class explanation.
* Forest types included, see text.
n = Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 11.--Frequency distribution, utilization, and weight of deer browse resources by preference class for bottomland seedling and sapling stands

Browse[1] preference class	Distribution of plots occupied							Distribution of browse classes utilized							Browse weight						
	Savannah River Bottom (81)* (n = 20)		Upper Three Runs Drainage (83) (n = 20)		Lower Three Runs Drainage (85) (n = 20)		Probability of a difference	Savannah River Bottom (81) (n = 20)		Upper Three Runs Drainage (83) (n = 20)		Lower Three Runs Drainage (85) (n = 20)		Probability of a difference	Savannah River Bottom (81) (n = 20)		Upper Three Runs Drainage (83) (n = 20)		Lower Three Runs Drainage (85) (n = 20)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent							Percent							Pounds per acre						Percent
1	55	(36 to 72)	41	(26 to 56)	46	(31 to 61)	n.s.	1	(0 to 4)	Tr.		Tr.		n.s.	20	(10 to 30)	23	(-16 to 63)	51	(-23 to 126)	n.s.
2	70	(53 to 85)	88	(76 to 96)	73	(64 to 82)	90.0	Tr.		Tr.		Tr.		--	41	(-22 to 104)	114	(-82 to 311)	15	(2 to 29)	n.s.
Desirable	89	(73 to 98)	94	(85 to 99)	87	(79 to 94)	n.s.	1	(0 to 2)	Tr.		Tr.		n.s.	61	(-1 to 122)	137	(-61 to 336)	66	(-10 to 143)	n.s.
3	90	(81 to 96)	86	(75 to 94)	90	(84 to 95)	n.s.	Tr.		0		Tr.		--	8	(5 to 12)	17	(9 to 25)	22	(12 to 31)	95 0
4	59	(41 to 75)	48	(34 to 63)	62	(43 to 79)	n.s.	0		0		Tr.		--	15	(-4 to 35)	122	(-28 to 271)	18	(9 to 26)	n.s
Undesirable	95	(89 to 98)	97	(93 to 99)	98	(94 to 100)	n.s.	Tr.		0		Tr.		--	23	(-5 to 42)	139	(-13 to 290)	40	(26 to 53)	n s
Total	100	(98 to 100)	100	(99 to 100)	100	(99 to 100)	n.s.	1	(0 to 2)	Tr.		1	(0 to 1)	n.s.	84	(24 to 148)	276	(37 to 519)	106	(35 to 185)	n s

[1] See text for browse class explanation.
* Forest types included, see text.
n = Number of locations.
Tr. - Trace (less than 0.5 percent).

Table 12.--Frequency distribution, utilization, and weight of deer browse resources by preference class for bottomland poletimber and sawtimber stands

Browse[1] preference class	Distribution of plots occupied							Distribution of browse classes utilized							Browse weight						
	Savannah River Bottom (82) (n = 20)		Upper Three Runs Drainage (84) (n = 20)		Lower Three Runs Drainage (86) (n = 20)		Probability of a difference	Savannah River Bottom (82) (n = 20)		Upper Three Runs Drainage (84) (n = 20)		Lower Three Runs Drainage (86) (n = 20)		Probability of a difference	Savannah River Bottom (82) (n = 20)		Upper Three Runs Drainage (84) (n = 20)		Lower Three Runs Drainage (86) (n = 20)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent							Percent							Pounds per acre						Percent
1	55	(31 to 78)	47	(29 to 65)	42	(22 to 64)	n.s.	13	(4 to 26)	Tr.		1	(0 to 4)	99 5	11	(7 to 16)	26	(0 to 52)	13	(-2 to 28)	n.s.
2	71	(55 to 84)	89	(79 to 96)	81	(64 to 93)	n.s.	Tr.		Tr.		Tr		--	2	(0 to 4)	18	(9 to 26)	16	(7 to 26)	99 5
Desirable	94	(88 to 98)	95	(88 to 99)	88	(73 to 97)	n.s.	7	(2 to 13)	Tr.		1	(0 to 2)	99 5	13	(8 to 18)	44	(11 to 76)	29	(12 to 47)	n.s
3	92	(83 to 98)	92	(84 to 98)	90	(81 to 96)	n.s.	1	(0 to 3)	Tr.		1	(0 to 2)	n.s	17	(11 to 24)	42	(14 to 70)	17	(10 to 24)	90.0
4	62	(45 to 77)	64	(48 to 78)	64	(52 to 75)	n.s	1	(0 to 5)	0		Tr		97.5	26	(-3 to 55)	31	(13 to 48)	26	(13 to 49)	n.s
Undesirable	98	(93 to 100)	99	(97 to 100)	99	(95 to 100)	n.s.	1	(0 to 3)	Tr.		Tr		n.s	43	(16 to 71)	73	(44 to 102)	43	(28 to 59)	n s
Total	100	(99 to 100)	100	(99 to 100)	100	(98 to 100)	n.s	4	(1 to 8)	Tr.		1	(0 to 2)	99 0	56	(33 to 75)	117	(73 to 166)	72	(56 to 102)	97 5

[1] See text for browse class explanation
Forest types included, see text
n Number of locations
Tr Trace (less than 0 5 percent)

Table 13.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on Savannah River Bottom sites

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Seedlings and saplings (81)* (n = 20)		Poletimber and sawtimber (82) (n = 20)		Probability of a difference	Seedlings and saplings (81) (n = 20)		Poletimber and sawtimber (82) (n = 20)		Probability of a difference	Seedlings and saplings (81) (n = 20)		Poletimber and sawtimber (82) (n = 20)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	55	(36 to 73)	65	(51 to 78)	n.s.	1	(0 to 4)	13	(4 to 26)	99.0	20	(10 to 30)	11	(7 to 16)	n.s.
2	70	(53 to 85)	71	(55 to 84)	n.s.	Tr.		Tr.		--	41	(-22 to 104)	2	(0 to 4)	n.s.
Desirable	89	(73 to 98)	94	(88 to 98)	n.s.	1	(0 to 2)	7	(2 to 13)	99.0	61	(-1 to 123)	13	(8 to 18)	n.s.
3	90	(81 to 96)	92	(83 to 98)	n.s.	Tr.		1	(0 to 3)	n.s.	8	(5 to 12)	17	(11 to 24)	97.5
4	59	(41 to 75)	62	(45 to 77)	n.s.	0		1	(0 to 5)	--	15	(-4 to 35)	26	(-3 to 55)	n.s.
Undesirable	95	(89 to 98)	98	(93 to 100)	n.s.	Tr.		1	(0 to 3)	n.s.	23	(5 to 42)	43	(16 to 71)	n.s.
Total	100	(98 to 100)	100	(99 to 100)	n.s.	1	(0 to 2)	4	(1 to 8)	97.5	84	(24 to 148)	56	(33 to 75)	n.s.

[1] See text for browse class explanation.
* Forest types included, see text.
n = Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 14.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on Upper Three Runs Drainage sites

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Seedlings and saplings (83)[2] (n = 20)		Poletimber and sawtimber (84) (n = 20)		Probability of a difference	Seedlings and saplings (83) (n = 20)		Poletimber and sawtimber (84) (n = 20)		Probability of a difference	Seedlings and saplings (83) (n = 20)		Poletimber and sawtimber (84) (n = 20)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	41	(26 to 56)	47	(29 to 65)	n.s.	Tr.		Tr.		--	23	(-16 to 63)	26	(0 to 52)	n.s.
2	88	(76 to 96)	89	(79 to 96)	n.s.	Tr.		Tr.		--	114	(-82 to 311)	18	(9 to 26)	n.s.
Desirable	94	(85 to 99)	95	(88 to 99)	n.s.	Tr.		Tr.		--	137	(-61 to 336)	44	(11 to 76)	n.s.
3	86	(75 to 94)	92	(84 to 98)	n.s.	0		Tr.		--	17	(9 to 25)	42	(14 to 70)	90.0
4	48	(34 to 63)	64	(48 to 78)	n.s.	0		0		--	122	(-28 to 271)	31	(13 to 48)	n.s.
Undesirable	97	(93 to 99)	99	(97 to 100)	n.s.	0		Tr.		--	139	(-13 to 290)	73	(44 to 102)	n.s.
Total	100	(99 to 100)	100	(99 to 100)	n.s.	Tr.		Tr.		--	276	(37 to 519)	117	(73 to 166)	n.s.

[1] See text for browse class explanation.
[2] Forest types included, see text.
n Number of locations.
Tr. Trace (less than 0.5 percent).

Table 15.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on Lower Three Runs Drainage sites

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Seedlings and saplings (85) (n = 20)		Poletimber and sawtimber (86) (n = 20)		Probability of a difference	Seedlings and saplings (85) (n = 20)		Poletimber and sawtimber (86) (n = 20)		Probability of a difference	Seedlings and saplings (85) (n = 20)		Poletimber and sawtimber (86) (n = 20)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	46	(31 to 61)	42	(22 to 64)	n.s.	Tr.		1	(0 to 4)	n.s.	51	(-23 to 126)	13	(-2 to 28)	n.s.
2	73	(64 to 82)	81	(64 to 93)	n.s.	Tr.		Tr.		--	15	(2 to 29)	16	(7 to 26)	n.s.
Desirable	87	(79 to 94)	88	(73 to 97)	n.s.	Tr.		1	(0 to 2)	n.s.	66	(-10 to 143)	29	(12 to 47)	n.s.
3	90	(84 to 95)	90	(81 to 96)	n.s.	Tr.		1	(0 to 2)	n.s.	22	(12 to 31)	17	(10 to 24)	n.s.
4	62	(43 to 79)	64	(52 to 75)	n.s.	Tr.		Tr.		--	18	(9 to 26)	26	(13 to 39)	n.s.
Undesirable	98	(94 to 100)	99	(95 to 100)	n.s.	Tr.		Tr.		--	40	(26 to 63)	43	(28 to 59)	n.s.
Total	100	(99 to 100)	100	(98 to 100)	n.s.	1	(0 to 1)	1	(0 to 2)	n.s.	106	(35 to 185)	72	(56 to 102)	n.s.

[1] See text for browse class explanation.
* Forest types included, see text
n = Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 16 --Frequency distribution, utilization, and weight of deer browse resources by preference class for forest type on natural upland sites

Browse[1] preference class	Distribution of plots occupied							Distribution of browse classes utilized							Browse weight						
	Natural pine (31, 32, 10) (n = 90)		Pine-hardwoods (50) (n = 30)		Longleaf-scrub oak and loblolly-scrub hardwoods (20, 40) (n = 50)		Probability of a difference	Natural pine (31, 32, 10) (n = 90)		Pine-hardwoods (50) (n = 30)		Longleaf-scrub oak and loblolly-scrub hardwoods (20, 40) (n = 50)		Probability of a difference	Natural pine (31, 32, 10) (n = 90)		Pine-hardwoods (50) (n = 30)		Longleaf-scrub oak and loblolly-scrub hardwoods (20, 40) (n = 50)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent							Percent							Pounds per acre						Percent
1	19	(14 to 26)	33	(21 to 48)	17	(11 to 25)	90.0	Tr.		7	(1 to 20)	1	(0 to 3)	99.0	5	(3 to 7)	10	(2 to 18)	30	(-15 to 74)	n.s.
2	35	(27 to 43)	78	(67 to 88)	43	(33 to 54)	99.5	Tr.		Tr.		Tr		--	6	(3 to 8)	11	(6 to 15)	6	(4 to 9)	90.0
Desirable	51	(42 to 59)	87	(78 to 94)	56	(46 to 65)	99.5	Tr		3	(1 to 6)	1	(0 to 2)	90.0	11	(7 to 14)	21	(10 to 32)	36	(-9 to 81)	n.s
3	74	(67 to 81)	95	(89 to 98)	91	(85 to 95)	99.5	Tr		Tr		Tr		--	8	(6 to 10)	20	(10 to 31)	19	(11 to 26)	99.5
4	55	(50 to 59)	57	(46 to 68)	41	(32 to 50)	99.0	0		Tr		0		--	19	(8 to 30)	31	(7 to 55)	54	(-6 to 113)	n.s.
Undesirable	90	(87 to 94)	97	(94 to 99)	96	(93 to 98)	99.0	Tr.		Tr		Tr		--	27	(16 to 38)	51	(25 to 77)	73	(13 to 131)	n.s.
Total	94	(91 to 96)	100	(99 to 100)	98	(96 to 99)	99.5	Tr.		2	(1 to 4)	Tr		99.5	38	(29 to 52)	72	(44 to 100)	109	(49 to 207)	99.0

[1] See text for browse class explanation
For t types included, see text
n = Number of locations
Tr = Trace (less than 0.5 percent)

Table 17.--Frequency distribution, utilization, and weight of deer browse resources by preference class for longleaf-scrub oak and loblolly-scrub hardwoods stands

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Longleaf-scrub oak (20)[2] (n = 20)		Loblolly-scrub hardwoods (40) (n = 30)		Probability of a difference	Longleaf-scrub oak (20) (n = 20)		Loblolly-scrub hardwoods (40) (n = 30)		Probability of a difference	Longleaf-scrub oak (20) (n = 20)		Loblolly-scrub hardwoods (40) (n = 30)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	8	(3 to 16)	25	(15 to 36)	97.5	Tr.		2	(0 to 7)	n.s.	6	(0 to 11)	46	(-30 to 122)	n.s.
2	34	(19 to 51)	50	(36 to 63)	n.s.	0		1	(0 to 2)	--	4	(1 to 6)	8	(4 to 12)	n.s.
Desirable	42	(28 to 60)	64	(51 to 75)	95.0	Tr.		2	(0 to 4)	95.0	10	(3 to 16)	54	(-22 to 129)	n.s.
3	97	(91 to 99)	85	(77 to 92)	97.5	0		Tr.		--	24	(7 to 42)	15	(9 to 20)	n.s.
4	33	(20 to 48)	46	(35 to 57)	n.s.	0		0		--	62	(-53 to 176)	48	(-21 to 118)	n.s.
Undesirable	98	(95 to 100)	94	(89 to 98)	n.s.	0		Tr.		--	86	(-28 to 200)	63	(-6 to 132)	n.s.
Total	99	(97 to 100)	97	(93 to 99)	n.s.	Tr.		1	(0 to 2)	97.5	96	(-16 to 212)	117	(35 to 262)	n.s.

[1] See text for browse class explanation.
[2] Forest types included, see text.
n = Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 18. --Frequency distribution, utilization, and weight of deer browse resources by preference class for natural loblolly and longleaf pine stands

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Loblolly (31, 32)* (n = 60)		Longleaf (10) (n = 30)		Probability of a difference	Loblolly (31, 32) (n = 60)		Longleaf (10) (n = 30)		Probability of a difference	Loblolly (31, 32) (n = 60)		Longleaf (10) (n = 30)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	18	(11 to 25)	23	(11 to 36)	n.s.	Tr.		2	(0 to 6)	90.0	6	(3 to 9)	3	(2 to 5)	n.s.
2	41	(30 to 52)	24	(13 to 36)	90.0	Tr.		Tr.		--	6	(3 to 9)	5	(1 to 10)	n.s.
Desirable	53	(42 to 64)	46	(32 to 61)	n.s.	Tr.		1	(0 to 6)	90.0	12	(8 to 16)	8	(3 to 13)	n.s.
3	76	(67 to 84)	72	(59 to 83)	n.s.	Tr.		0		--	9	(6 to 12)	6	(4 to 9)	n.s.
4	56	(50 to 63)	51	(42 to 59)	n.s.	0		0		--	14	(8 to 20)	29	(-4 to 61)	n.s.
Undesirable	91	(87 to 95)	88	(80 to 94)	n.s.	Tr.		0		--	23	(17 to 29)	35	(3 to 67)	n.s.
Total	95	(91 to 97)	93	(86 to 97)	n.s.	Tr.		Tr.		--	35	(29 to 44)	43	(15 to 81)	n.s.

[1]See text for browse class explanation.
*Forest types included, see text.
n - Number of locations.
Tr. Trace (less than 0.5 percent).

Table 19.--Frequency distribution, utilization, and weight of deer browse resources by preference class for stand size on natural loblolly pine sites

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Seedlings and saplings (31)* (n = 30)		Poletimber and sawtimber (32) (n = 30)		Probability of a difference	Seedlings and saplings (31) (n = 30)		Poletimber and sawtimber (32) (n = 30)		Probability of a difference	Seedlings and saplings (31) (n = 30)		Poletimber and sawtimber (32) (n = 30)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	9	(4 to 16)	28	(16 to 43)	99.0	0		Tr.		--	3	(-1 to 7)	9	(3 to 14)	90.0
2	42	(25 to 61)	39	(26 to 52)	n.s.	Tr.		Tr.		--	8	(3 to 13)	5	(2 to 7)	n.s.
Desirable	51	(34 to 68)	55	(41 to 69)	n.s.	Tr.		Tr.		--	11	(4 to 17)	14	(7 to 20)	n.s.
3	79	(65 to 90)	72	(61 to 82)	n.s.	Tr.		Tr.		--	10	(6 to 15)	8	(4 to 12)	n.s.
4	51	(43 to 59)	62	(52 to 71)	90.0	0		0		--	13	(3 to 24)	15	(8 to 22)	n.s.
Undesirable	92	(85 to 97)	91	(85 to 96)	n.s.	Tr.		Tr.		--	23	(13 to 34)	23	(15 to 30)	n.s.
Total	95	(90 to 98)	95	(90 to 98)	n.s.	Tr.		Tr.		--	34	(23 to 48)	37	(27 to 47)	n.s.

[1] See text for browse class explanation.
* Forest types included, see text.
n = Number of locations
Tr. Trace (less than 0.5 percent).

Table 20.--Frequency distribution, utilization, and weight of deer browse resources by preference class for planted and natural pine stands

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Planted pine (01, 02, 03)* (n = 90)		Natural Pine (10, 31, 32) (n = 90)		Probability of a difference	Planted pine (01, 02, 03) (n = 90)		Natural pine (10, 31, 32) (n = 90)		Probability of a difference	Planted pine (01, 02, 03) (n = 90)		Natural pine (10, 31, 32) (n = 90)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	7	(3 to 9)	19	(13 to 26)	99.5	Tr.		Tr.		--	6	(-1 to 13)	5	(3 to 7)	n. s.
2	13	(8 to 17)	35	(27 to 43)	99.5	Tr.		Tr.		--	4	(2 to 7)	6	(3 to 8)	n. s.
Desirable	20	(15 to 27)	51	(42 to 59)	99.5	Tr.		Tr.		--	10	(2 to 18)	11	(7 to 14)	n. s.
3	45	(35 to 55)	74	(67 to 81)	99.5	Tr.		Tr.		--	8	(3 to 12)	8	(6 to 10)	n. s.
4	50	(43 to 57)	55	(50 to 59)	n. s.	Tr.		0		--	33	(16 to 49)	19	(8 to 30)	n. s.
Undesirable	80	(73 to 85)	90	(87 to 94)	99.5	Tr.		Tr.		--	41	(23 to 57)	27	(16 to 38)	n. s.
Total	84	(78 to 89)	94	(91 to 96)	99.5	Tr.		Tr.		--	51	(29 to 54)	38	(29 to 52)	n. s.

[1] See text for browse class explanation.
* Forest types included, see text.
n - Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 21. --Frequency distribution, utilization, and weight of deer browse resources by preference class for thinning class on pine plantations

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	Nonthinned (01, 02)[2] (n = 60)		Thinned (03) (n = 30)		Probability of a difference	Nonthinned (01, 02) (n = 60)		Thinned (03) (n = 30)		Probability of a difference	Nonthinned (01, 02) (n = 60)		Thinned (03) (n = 30)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	3	(1 to 5)	14	(7 to 23)	99.5	0		Tr.		--	7	(-3 to 17)	4	(0 to 7)	n.s.
2	9	(5 to 14)	21	(12 to 32)	97.5	Tr.		0		--	4	(1 to 6)	6	(-1 to 13)	n.s.
Desirable	12	(9 to 19)	35	(25 to 52)	99.5	Tr.		Tr.		--	11	(-1 to 22)	10	(2 to 17)	n.s.
3	36	(25 to 49)	62	(47 to 76)	97.5	0		Tr.		--	5	(3 to 8)	12	(-3 to 26)	n.s.
4	56	(47 to 64)	39	(29 to 51)	95.0	0		Tr.		--	47	(23 to 71)	4	(1 to 6)	97.5
Undesirable	79	(71 to 86)	81	(68 to 91)	n.s.	0		Tr.		--	52	(29 to 76)	16	(1 to 30)	95.0
Total	81	(74 to 88)	89	(79 to 96)	n.s.	Tr.		Tr.		--	63	(34 to 71)	26	(10 to 29)	97.5

[1] See text for browse class explanation.
[2] Forest types included, see text.
n = Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 22. --Frequency distribution, utilization, and weight of deer browse resources by preference class for age class on nonthinned pine plantations

Browse[1] preference class	Distribution of plots occupied					Distribution of browse classes utilized					Browse weight				
	0-6 years (01)* (n - 30)		6+ years (02) (n - 30)		Probability of a difference	0-6 years (01) (n - 30)		6+ years (02) (n = 30)		Probability of a difference	0-6 years (01) (n - 30)		6+ years (02) (n - 30)		Probability of a difference
	Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05		Mean	Confidence limits .05	Mean	Confidence limits .05	
	Percent					Percent					Pounds per acre				Percent
1	3	(1 to 6)	3	(1 to 8)	n.s.	0		0		--	2	(0 to 3)	13	(-9 to 34)	n.s.
2	8	(3 to 16)	10	(4 to 17)	n.s.	0		Tr.		--	4	(-1 to 9)	3	(1 to 5)	n.s.
Desirable	11	(7 to 22)	13	(7 to 22)	n.s.	0		Tr.		--	6	(0 to 111)	16	(-7 to 38)	n.s.
3	37	(21 to 53)	36	(19 to 55)	n.s.	0		0		--	6	(2 to 9)	5	(2 to 8)	n.s.
4	69	(56 to 81)	41	(33 to 50)	99.5	0		0		--	72	(26 to 118)	22	(10 to 33)	95.0
Undesirable	87	(78 to 94)	70	(58 to 81)	97.5	0		0		--	78	(32 to 123)	27	(16 to 38)	95.0
Total	89	(81 to 95)	72	(60 to 82)	99.0	0		Tr.		--	82	(35 to 89)	43	(18 to 69)	n.s.

[1] See text for browse class explanation.
* Forest types included, see text.
n = Number of locations.
Tr. = Trace (less than 0.5 percent).

Table 23.--Comparison of the average number of woody species per sample plot by overstory class

Overstory class	Average number species		
I. Pine plantations (longleaf, slash, loblolly)	1.6		
A. Nonthinned		1.4	
1. 0-6 years old			1.5
2. 6+ years old			1.3
B. Thinned (6+ years old)		1.9	
II. Natural upland stands	3.1		
A. Pines		2.7	
1. Longleaf			2.4
2. Loblolly			2.8
a. Seedlings and saplings			2.7
b. Poletimber and sawtimber			3.0
B. Scrub		3.0	
1. Longleaf-oak			2.8
2. Loblolly-hardwoods			3.2
C. Pine-hardwoods		4.5	
III. Bottomland hardwoods	4.6		
A. Seedlings and saplings		4.5	
B. Poletimber and sawtimber		4.7	
C. Savannah River Bottom		4.3	
1. Seedlings and saplings			4.2
2. Poletimber and sawtimber			4.3
D. Upper Three Runs Drainage		4.9	
1. Seedlings and saplings			4.7
2. Poletimber and sawtimber			5.1
E. Lower Three Runs Drainage		4.7	
1. Seedlings and saplings			4.6
2. Poletimber and sawtimber			4.8
Mean	3.7		

Table 24.--List of utilized locations by forest type showing percent of browse plants used

Forest type[1]	Location number	Percent used
2	395	3.2
3	386	3.7
3	469	7.1
3	960	4.5
3	971	5.7
10	226	8.3
10	319	8.6
10	372	3.2
10	397	6.3
10	540	5.6
10	602	3.0
20	559	3.0
31	533	2.2
31	558	1.8
31	578	2.3
31	912	25.0
31	934	6.3
32	37	1.9
32	233	11.1
32	425	5.6
32	530	1.6
32	573	8.1
32	590	1.8
40	146	2.8
40	198	3.3
40	290	9.1
40	313	5.1
40	318	13.3
40	465	9.4
40	575	2.4
40	576	9.5
40	607	18.2
50	7	3.6
50	225	17.9
50	265	12.1
50	289	22.6
50	338	2.4
50	339	12.1
50	592	5.0
50	595	2.8
50	974	6.9
50	980	2.6
50	982	10.7
50	984	6.0
50	991	2.2
81	393	1.9
81	420	2.2
81	946	2.0
81	948	2.5
81	949	2.9
81	952	12.5
81	979	5.2
81	983	1.7
81	985	3.6
82	418	1.7
82	441	2.8
82	442	3.8
82	486	1.9
82	505	1.9
82	509	46.2
82	528	3.8
82	552	14.3
82	572	7.4
82	589	16.7
82	594	5.1
82	609	1.8
82	619	6.0
82	620	18.3
82	628	1.7
83	346	9.1
83	534	1.7
83	908	3.0
83	919	1.2
83	950	1.4
84	84	2.0
84	271	24.4
84	406	1.9
84	494	4.0
85	414	3.9
85	417	2.6
85	922	5.4
85	943	2.6
85	951	2.9
85	964	3.1
85	988	3.7
85	989	2.9
86	415	4.2
86	435	2.8
86	439	1.7
86	459	3.2
86	461	6.1
86	484	1.4
86	520	9.3
86	549	4.2
86	597	1.5
86	909	1.8
86	965	1.8
86	972	4.2

[1]See table 2 in text for explanation of forest type code.

Table 25.--A list of woody species dominant on one or more plots by forest type, and arranged by preference classes

Browse preference class		Pine plantations			Natural stands													
		Non-thinned		6+ years - thinned	Longleaf pine	Longleaf-scrub oak	Loblolly pine		Loblolly-scrub hardwoods	Pine-hardwoods	Bottomland hardwoods					
											Savannah River Bottom		Upper Three Runs Drainage		Lower Three Runs Drainage	
		0-6 years	6+ years				Seedlings and saplings	Poletimber and sawtimber			Seedlings and saplings	Poletimber and sawtimber	Seedlings and saplings	Poletimber and sawtimber	Seedlings and saplings	Poletimber and sawtimber
Preferred																
Greenbrier	Smilax spp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Japanese honeysuckle	Lonicera japonica Thunb.	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Staple																
Blackgum	Nyssa sylvatica Marsh.		X	X	X	X	X	X	X	X	X		X	X	X	X
Boxelder	Acer negundo L.											X				
Bramble	Rubus spp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chokeberry	Pyrus spp.									X	X		X	X		
Climbing hydrangea	Decumaria barbara L.									X		X				
Eastern baccharis	Baccharis halimifolia L.										X					
Flowering dogwood	Cornus florida L.			X		X		X	X		X		X	X	X	X
Grape	Vitis spp.		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Green ash	Fraxinus pennsylvanica Marsh.													X		
Black maple	Acer nigrum Michx. f.	X		X			X		X	X	X		X			
Piedmont azalea	Rhododendron canescens (Michx.) Sweet				X			X	X	X						
Rattan-vine	Berchemia scandens (Hill) K. Koch			X							X					
Redbay	Persea borbonia (L.) Spreng.						X			X	X		X	X	X	X
Sassafras	Sassafras albidum (Nutt.) Nees	X	X	X	X	X	X	X					X			X
Serviceberry	Amelanchier spp.					X				X				X		
Soft maple	Acer rubrum L., A. barbatum Michx., A. leucoderme Small			X									X	X		
St. John's-wort	Hypericum spp.		X	X						X			X			
Swamp-honeysuckle	Rhododendron viscosum (L.) Torr.							X	X		X					X
Sweetbay	Magnolia virginiana L.								X	X		X	X	X	X	X
Sweetshrub	Calycanthus spp.									X			X			
Viburnum	Viburnum spp.				X				X	X	X		X	X	X	
White ash	Fraxinus americana L.											X				
Willow	Salix spp.									X					X	
Yellow jessamine	Gelsemium sempervirens (L.) Ait. f.	X		X	X	X	X	X	X	X	X		X	X	X	X
Yellow-poplar	Liriodendron tulipifera L.									X						

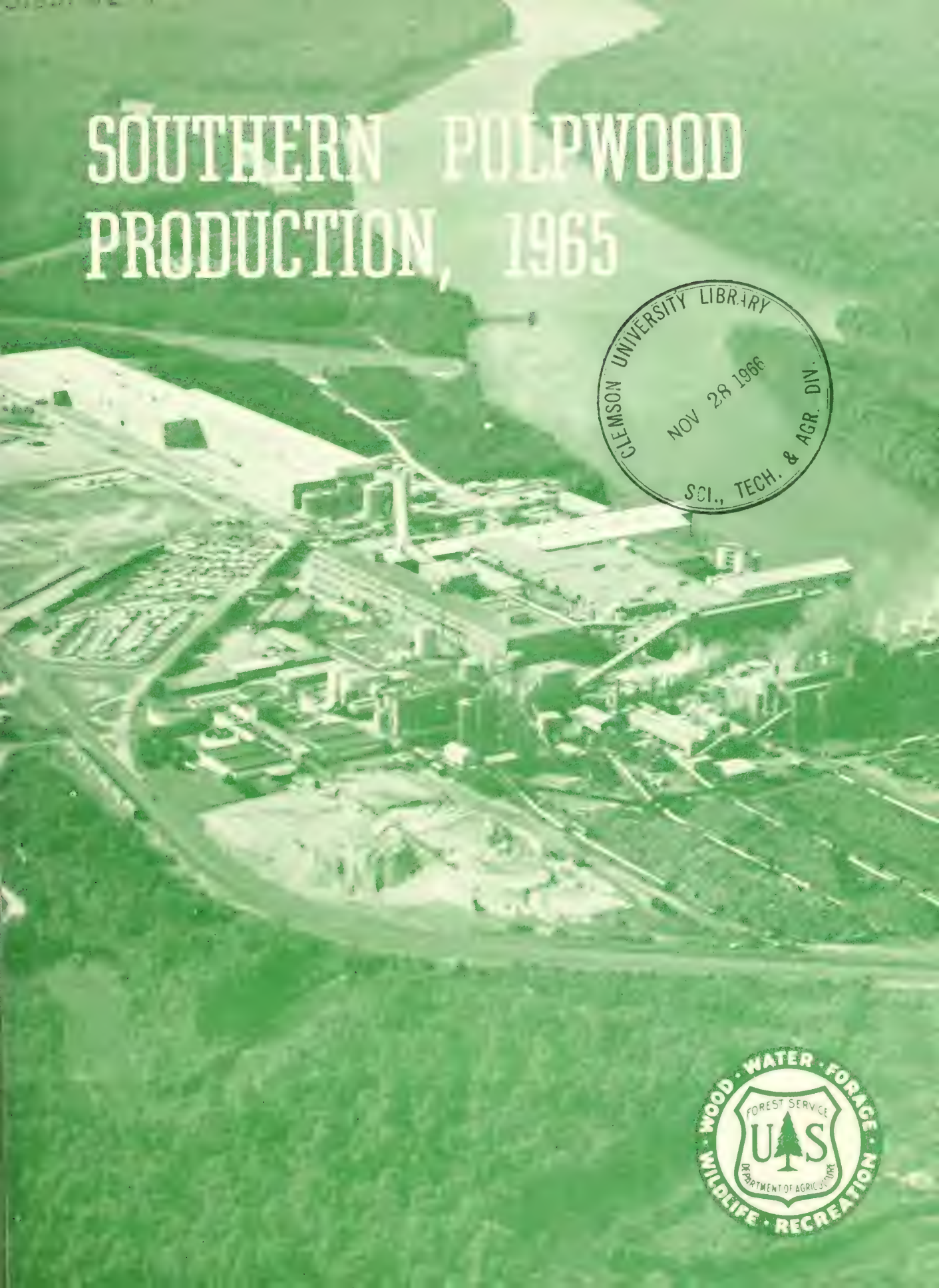
Table 25.--A list of woody species dominant on one or more plots by forest type, and arranged by preference classes (continued)

Browse preference class		Pine plantations			Natural stands													
		Non-thinned					Loblolly pine				Bottomland hardwoods							
											Savannah River Bottom		Upper Three Runs Drainage		Lower Three Runs Drainage			
		0-6 years	6+ years	6+ years - thinned	Longleaf pine	Longleaf-scrub oak	Seedlings and saplings	Poletimber and sawtimber	Loblolly-scrub hardwoods	Pine-hardwoods	Seedlings and saplings	Poletimber and sawtimber	Seedlings and saplings	Poletimber and sawtimber	Seedlings and saplings	Poletimber and sawtimber
Emergency																
Black cherry	Prunus serotina Ehrh.		X	X	X	X	X	X	X					X		
Black oak	Quercus velutina Lam.				X											
Blueberry	Vaccinium spp.	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Cherrybark oak	Quercus falcata var. pagodaefolia Ell.							X								
Gallberry	Ilex glabra (L.) Gray			X			X		X	X			X	X	X	
Common persimmon	Diospyros virginiana L.	X	X	X	X	X	X	X	X	X	X	X		X	X	
Common sweetleaf	Symplocos tinctoria (L.) L'Her.									X						X
Cross-vine	Bignonia capreolata L.				X			X			X	X				
Possumhaw	Ilex decidua Walt.							X			X	X			X	
French mulberry	Callicarpa americana L.				X											
Live oak	Quercus virginiana Mill.								X	X						
Loblolly-bay	Gordonia lasianthus (L.) Ellis												X		X	X
Mountain-holly	Nemopanthus mucronata (L.) Trel.					X				X						
Mountain-laurel	Kalmia latifolia L.									X						
Plum	Prunus spp.	X	X	X	X	X	X	X	X					X	X	
Poison-ivy	Rhus radicans L.				X	X			X		X	X				X
Post oak	Quercus stellata Wangenh.			X	X	X				X					X	X
Red mulberry	Morus rubra L.															X
Scrub red oaks	Quercus marilandica Muenchh., Q. incana Bartr., Q. laevis Walt.	X	X	X	X	X	X	X	X	X				X	X	X
Scrub white oaks	Quercus stellata var. margaretta (Ashe) Sarg., Q. prinoides Willd.				X	X	X		X					X		
Southern red oak	Quercus falcata Michx.												X			
Sumac	Rhus spp.	X	X	X	X	X	X	X	X	X				X	X	X
Swamp chestnut oak	Quercus michauxii Nutt.													X		
Sweet crab apple	Malus coronaria (L.) Mill.						X		X	X			X			
Sweetgum	Liquidambar styraciflua L.		X	X	X		X	X	X	X	X	X	X	X	X	X
Switch cane	Arundinaria tecta (Walt.) Muhl.		X	X		X	X	X	X	X	X	X	X	X	X	X
Trumpet-creeper	Campsis radicans (L.) Seem.	X	X	X			X	X	X		X	X	X		X	
Virginia-willow	Itea virginica L.									X	X			X	X	X
Water and willow oaks	Quercus nigra L. and Q. phellos L.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wax-myrtle	Myrica spp.	X		X	X	X	X	X	X	X	X		X	X	X	X
White oak	Quercus alba L.										X					

Table 25.--A list of woody species dominant on one or more plots by forest type, and arranged by preference classes (continued)

Browse preference class		Pine plantations			Natural stands													
		Non-thinned					Loblolly pine				Bottomland hardwoods					
											Savannah River Bottom		Upper Three Runs Drainage		Lower Three Runs Drainage	
		0-6 years	6+ years	6+ years - thinned	Longleaf pine	Longleaf-scrub oak	Seedlings and saplings	Poletimber and sawtimber	Loblolly-scrub hardwoods	Pine-hardwoods	Seedlings and saplings	Poletimber and sawtimber	Seedlings and saplings	Poletimber and sawtimber	Seedlings and saplings	Poletimber and sawtimber
Stuffing:																
Alder	Alnus spp.												X		X	
American beech	Fagus grandifolia Ehrh.							X			X					
American holly	Ilex opaca Ait.			X	X	X	X	X	X	X	X	X	X	X	X	X
Beargrass	Yucca filamentosa L.		X													
Bigleaf snowbell	Styrax grandifolia Ait.					X										X
American hornbeam (Blue beech)	Carpinus caroliniana Walt.					X					X					
Carolina laurelcherry	Prunus caroliniana (Mill.) Ait.										X	X				
Chinaberry	Melia azedarach L.													X		
Common buttonbush	Cephalanthus occidentalis L.						X		X			X				
Conradina	Conradina verticillata Jennison	X														
Doghobble	Leucothoe spp.							X	X	X		X	X	X	X	X
Hackberry	Celtis spp.		X		X			X			X	X	X			X
Hawthorn	Crataegus spp.	X	X	X	X	X	X	X	X	X			X	X		
Hercules-club	Zanthoxylum clava-herculis L.												X			
Hickories	Carya spp.				X	X		X	X	X			X	X	X	X
Loblolly pine	Pinus taeda L.	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Longleaf pine	Pinus palustris Mill.	X	X	X	X	X	X	X		X						X
New Jersey tea	Ceanothus americanus L.				X											
Pricklypear	Opuntia humifusa Raf.	X	X		X	X	X	X	X	X						
Sand-myrtle	Leiophyllum buxifolium (Berg.) Ell.								X							
Scrub palmetto	Sabal etonia Swingle			X					X	X	X	X				
Shortleaf pine	Pinus echinata Mill.				X		X		X							
Slash pine	Pinus elliottii Engelm.	X	X	X	X		X	X	X				X		X	
Sweet gale	Myrica gale L.													X	X	X
Virginia creeper	Parthenocissus quinquefolia (L.) (Planch.)														X	X

SOUTHERN POLPWOOD PRODUCTION, 1965



CLEMSON UNIVERSITY LIBRARY
NOV 28 1966
SCI., TECH. & AGR. DIV.

WOOD · WATER · FORAGE · WILDLIFE · RECREATION
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

In this report:

	Page
SOUTHERN PULPWOOD PRODUCTION BY—	
—state	1,2
—species group	2
—county	4,5,9-19
—roundwood and residues	8
—territory	9
MAP OF SOUTHERN COUNTIES	3
PULP COMPANIES USING SOUTHERN WOOD	6,7
PULPMILLS USING SOUTHERN WOOD BY—	
—capacity and location	2,20-22, Inside Back Cover
—process and location	20,21

Cover photo by North Carolina Division of Forestry.

SOUTHERN PULPWOOD PRODUCTION, 1965

Richard L. Welch

SOUTHEASTERN FOREST EXPERIMENT STATION
Asheville, North Carolina

and

SOUTHERN FOREST EXPERIMENT STATION
New Orleans, Louisiana

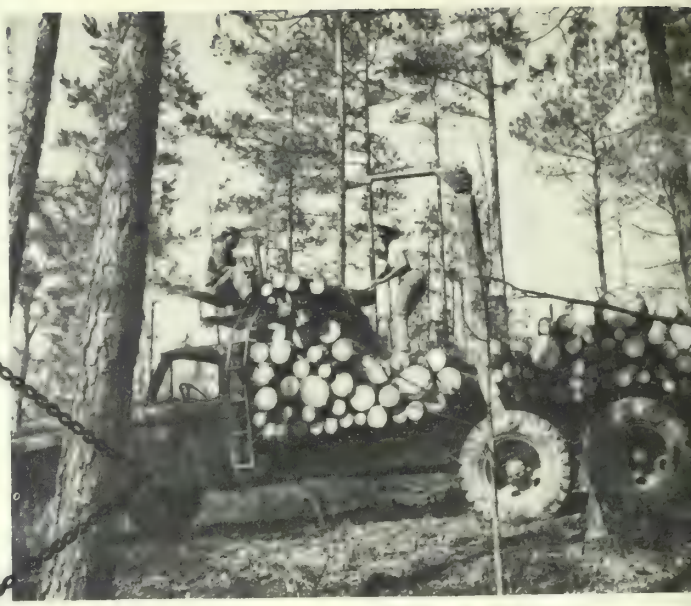
of the

Forest Service, U. S. Department of Agriculture

in cooperation with

SOUTHERN PULPWOOD CONSERVATION ASSOCIATION
Atlanta, Georgia

1966



PULPWOOD PRODUCTION IN THE SOUTH established another record high of 30,790,800 cords in 1965—63 percent of the Nation's total. At the year's end, there were 82 pulpmills in operation in the South, and their combined pulping capacities exceeded 59,000 tons per day. Eight new mills now under construction will boost the total daily capacity by 4,000 tons. Nine mills located outside the Region drew wood from the South in 1965.

In 1965, pulpwood production was up almost 2 million cords, or 7 percent, from 1964. Pine roundwood provided 49 percent of the total increase; hardwood roundwood accounted for 27 percent. The remaining increase in production came from plant byproducts obtained from other wood-manufacturing plants. Pulpwood made from byproducts totaled over 5 million cords and comprised almost 17 percent of the total production.

Significant gains in production were reported in 10 of the 12 states. Total production in South Carolina and Tennessee remained virtually the same as 1964 (table 1). The largest increase

Table 1. *Pulpwood production in the South during 1965, and change since 1964*

State	Round pulpwood and residues	Change
	Thousand cords	*Percent*
Alabama	4,862.8	+17
Arkansas	2,092.2	+ 1
Florida	2,874.4	+ 5
Georgia	6,159.6	+ 5
Louisiana	2,453.8	+ 2
Mississippi	2,263.3	+ 5
North Carolina	2,855.7	+ 9
Oklahoma	91.7	+30
South Carolina	2,631.4	(1)
Tennessee	415.9	(1)
Texas	1,669.0	+ 5
Virginia	2,421.0	+14
All States	30,790.8	+ 7

[1] Negligible.

was reported in Alabama, where production was up by over 700,000 cords. In fact, production in Alabama will very likely increase to a much higher level over the next few years in response to the new mills locating there. Production in Georgia was up by over 300,000 cords and this State now ranks first in the Nation after consistently leading the South in pulpwood production over the years. Other states reporting gains of more than 100,000 cords include Virginia, North Carolina, Florida, and Mississippi.

At the county level, Union Parish, Louisiana, with a harvest of 203,484 cords, led the South in roundwood production for the second consecutive year. Baldwin County, Alabama, with 200,750 cords, had the second highest production. Thirty-seven counties produced over 100,000 cords each, compared to 28 in 1964.

The growth of the southern pulpwood industry over the past 20 years has been remarkable. There has been an almost fourfold increase in pulpwood production and pulping capacity over this relatively short span of time. Several trends have emerged from the overall growth pattern. From 1946 to 1956, production of pine roundwood more than doubled and then tended to level off up through 1963. Since 1963, production has again started to climb sharply (fig. 1). Use of hardwoods for pulpwood has been on the rise since 1950, and in recent years there has been a trend toward greater use of the oaks and other hard-textured species. These hard-textured species now comprise an estimated 44 percent of total roundwood production of hardwood, compared to

Table 2. *Round pulpwood production in the South, by State and species group, 1965*

State	All species	Pine	Soft hardwoods				Hard hardwoods			Total hardwoods
			Gums	Yellow-poplar, cottonwood, willow, magnolia, maple, basswood, and boxelder	Elm, hackberry, and sycamore	Total soft hardwoods	Oaks	Other hardwoods	Total hard hardwoods	
	Thousand cords									
Alabama	4,068.6	3,033.0	463.4	159.6	61.7	684.7	277.2	73.7	350.9	1,035.6
Arkansas	1,511.1	968.9	125.9	39.8	5.3	171.0	367.3	3.9	371.2	542.2
Florida	2,597.3	2,324.9	92.8	27.2	11.0	131.0	121.4	20.0	141.4	272.4
Georgia	5,346.8	4,776.5	298.7	38.6	7.7	345.0	197.4	27.9	225.3	570.3
Louisiana	2,096.3	1,540.7	278.4	67.3	27.0	372.7	160.2	22.7	182.9	555.6
Mississippi	1,878.8	1,035.5	394.4	197.8	54.5	646.7	123.0	73.6	196.6	843.3
North Carolina	2,267.9	1,705.2	167.1	97.1	20.9	285.1	207.5	70.1	277.6	562.7
Oklahoma	38.5	8.0	1.6	22.8	2.1	26.5	3.9	.1	4.0	30.5
South Carolina	2,173.6	1,695.0	209.3	60.5	17.3	287.1	159.1	32.4	191.5	478.6
Tennessee	384.6	184.3	7.0	37.4	7.7	52.1	132.3	15.9	148.2	200.3
Texas	1,156.2	789.9	197.5	26.8	7.8	232.1	129.6	4.6	134.2	366.3
Virginia	2,094.2	1,424.0	70.0	90.6	19.3	179.9	410.5	79.8	490.3	670.2
All States	25,613.9	19,485.9	2,306.1	865.5	242.3	3,413.9	2,289.4	424.7	2,714.1	6,128.0

only 28 percent as recent as 1959 (table 2). Use of byproducts for pulpwood in the South began about 1953, and the volume used has increased each year.

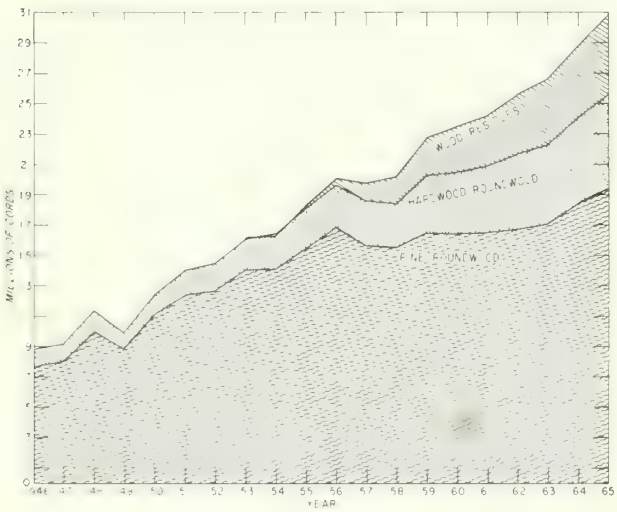


Figure 1. *Pulpwood production in the South by pine and hardwood roundwood and residues.*

With the growth in pulping capacity, there has been a trend toward larger mills, as evidenced by the increase in the average size of mill. In 1946, pulping capacity at the 50 mills located in the South averaged only about 320 tons per day, compared to 720 tons for the average-size mill today (table 3). Of the 82 pulpmills in the South today, 23 have daily pulping capacities exceeding 1,000 tons, and 5 of these mills can produce 1,500 tons or more per day.

Table 3. *Pulping capacity in the South by State, 1965 and 1946*

State	Pulping capacity, 24 hours	
	1965	1946
	Tons	
Alabama	6,569	1,106
Arkansas	2,910	635
Florida	8,065	2,045
Georgia	11,048	1,360
Louisiana	6,235	3,283
Mississippi	3,573	1,348
North Carolina	4,685	1,322
Oklahoma	315	
South Carolina	5,090	1,975
Tennessee	2,720	350
Texas	3,200	665
Virginia	4,820	1,850
All States	59,230	15,939

The current wave of expansion in the pulp industry that is sweeping across the Region has seldom been exceeded anywhere. At the end of 1965, eight new mills were under construction in the South. Three mills are being erected in Alabama; and Arkansas, Georgia, Louisiana, Mississippi, and Texas each have one under construction. The combined pulping capacity of these new mills is expected to total 4,000 tons per day, and their completion should create a demand for an additional 2 million cords of wood annually. There are also plans and proposals for still more mills and for the further expansion of pulping facilities at existing mills in the South.

Figure 2. *Southern counties.*

Figure 3. *Pine roundwood production by county, 1965.*

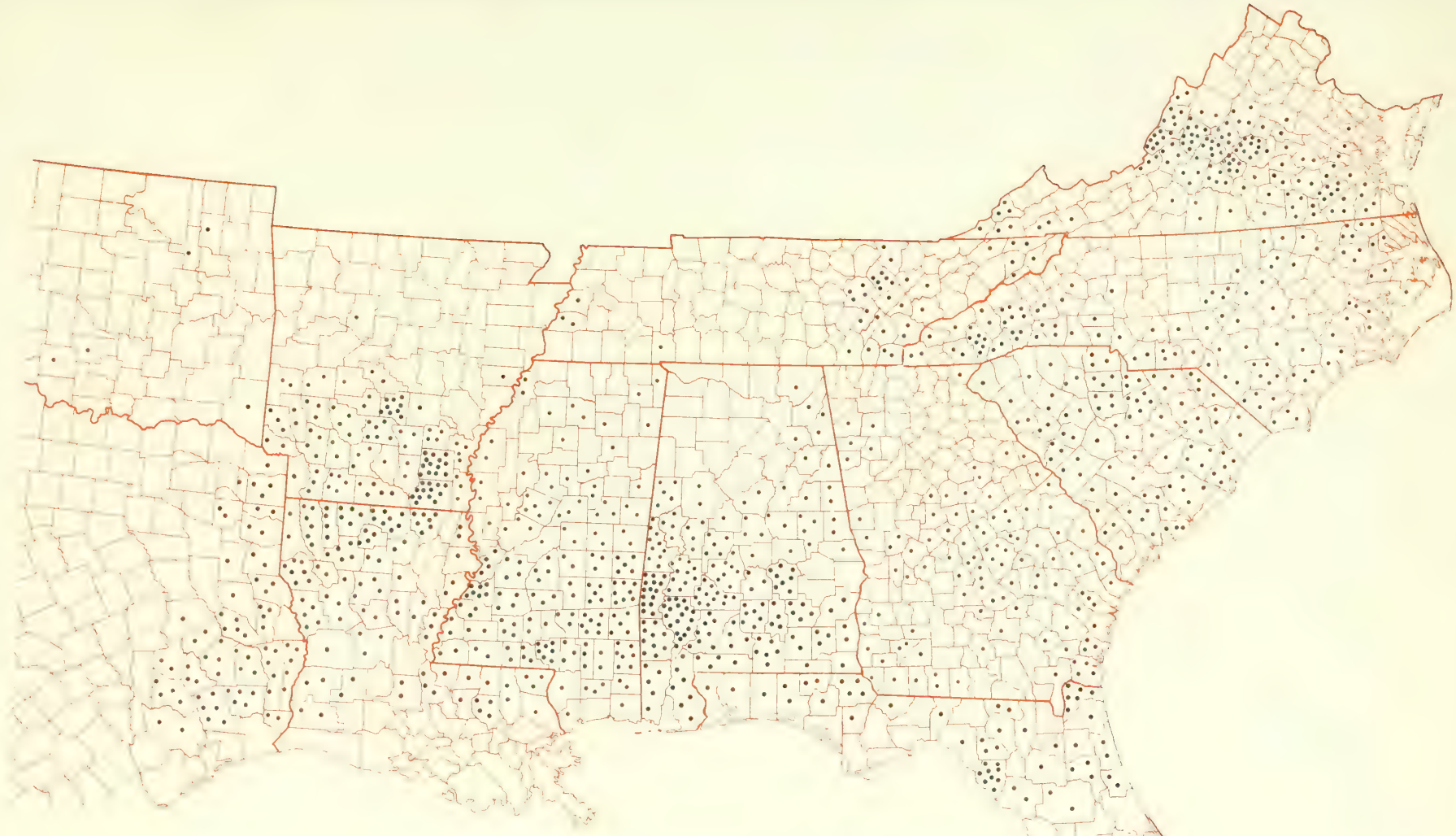


Figure 4.—*Hardwood roundwood production by* [illegible] *1965.*

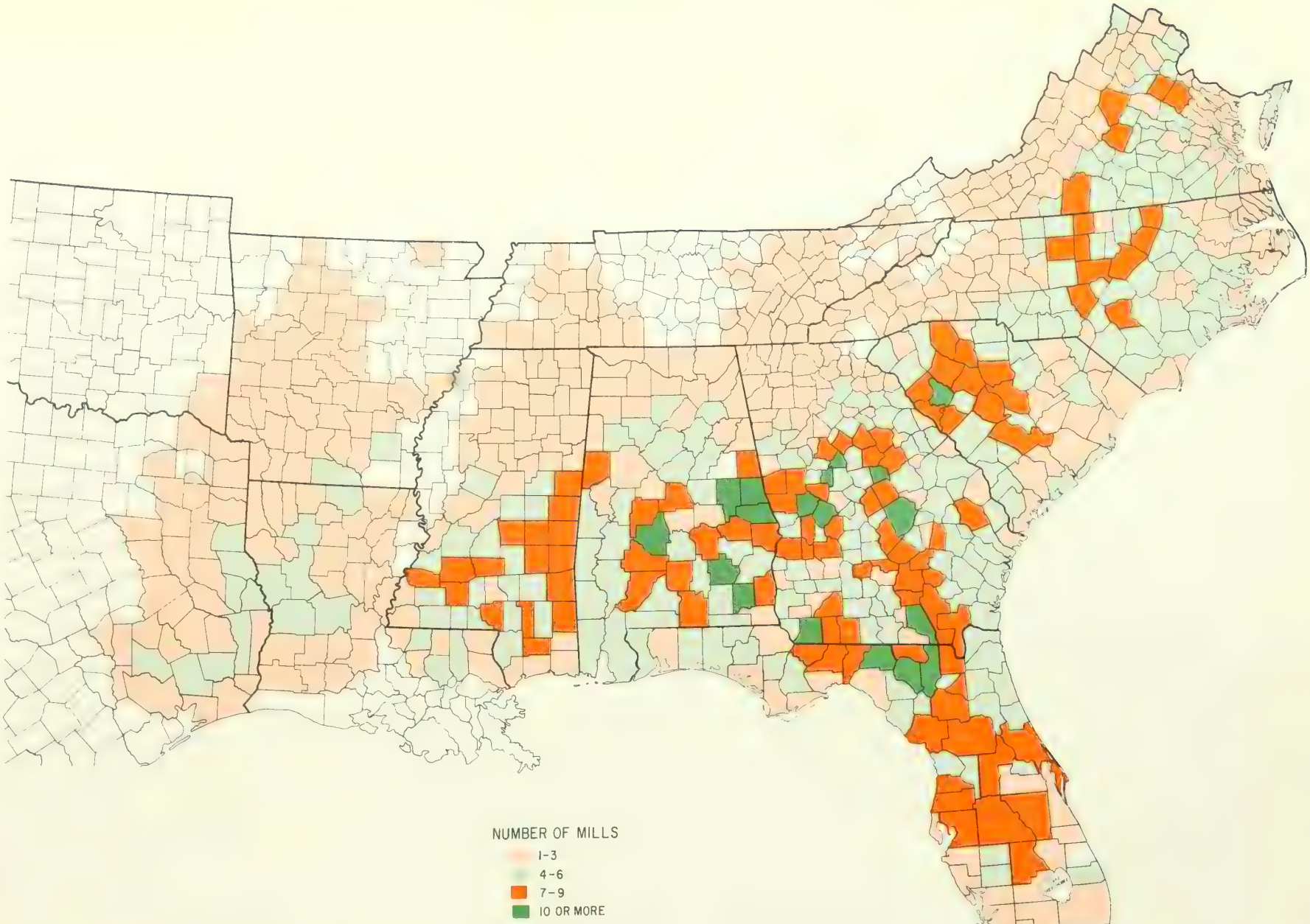


Figure 5.—Number of mills procuring pine roundwood, 1965.

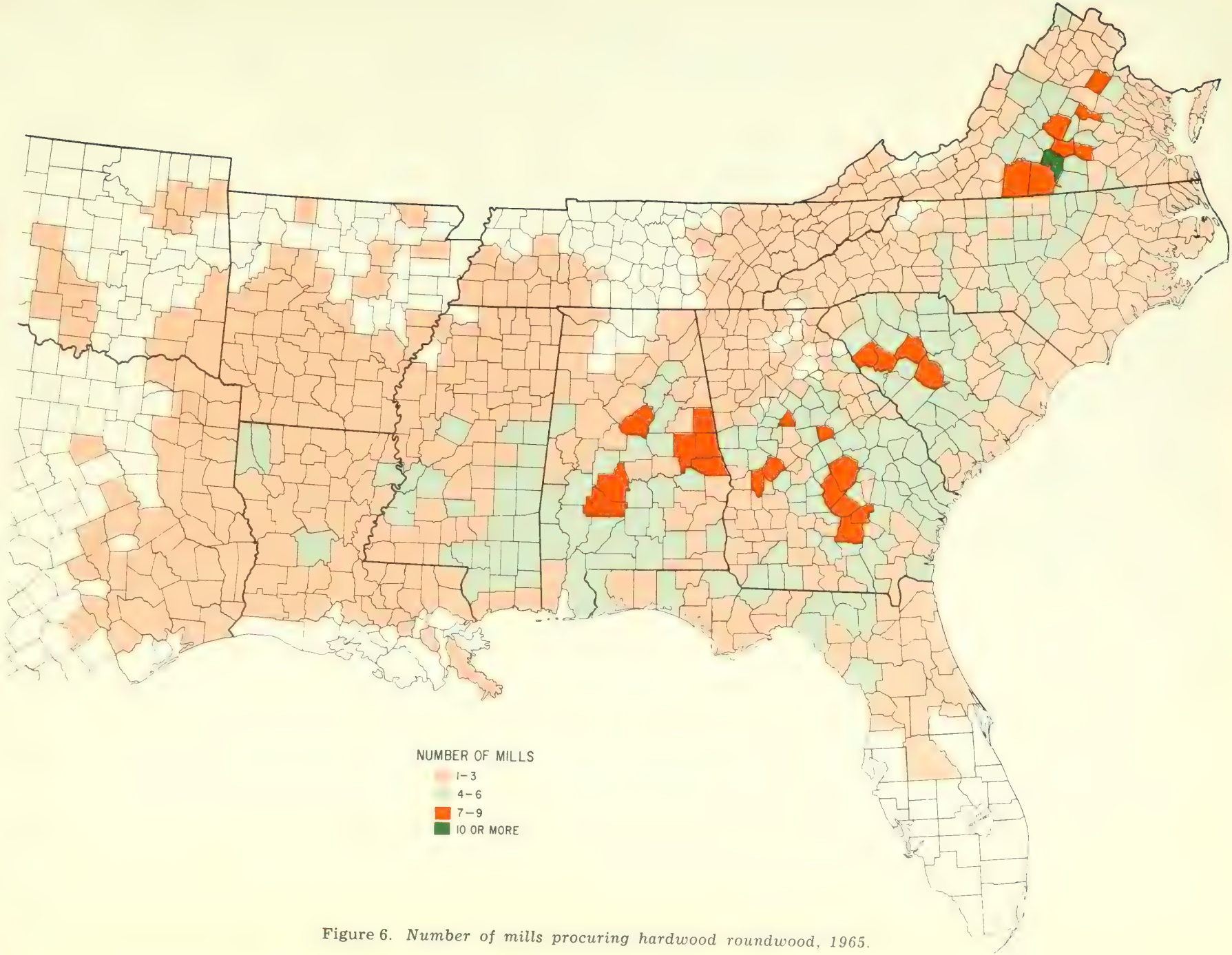


Figure 6. *Number of mills procuring hardwood roundwood, 1965.*

Table 4. *Round pulpwood production in the South, by State and species group, 1965 and 1964*

State	Change from 1964	1965			1964		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Percent	*Thousand cords*					
Alabama	+17	4,068.6	3,033.0	1,035.6	3,463.4	2,644.8	818.6
Arkansas	+ 1	1,511.1	968.9	542.2	1,497.3	1,041.7	455.6
Florida	+ 5	2,597.3	2,324.9	272.4	2,482.5	2,238.9	243.6
Georgia	+ 5	5,346.8	4,776.5	570.3	5,082.2	4,556.1	526.1
Louisiana	— 1	2,096.3	1,540.7	555.6	2,109.0	1,584.0	525.0
Mississippi	+ 4	1,878.8	1,035.5	843.3	1,801.9	941.9	860.0
North Carolina	+10	2,267.9	1,705.2	562.7	2,070.1	1,527.7	542.4
Oklahoma	+63	38.5	8.0	30.5	23.6	3.9	19.7
South Carolina	(1)	2,173.6	1,695.0	478.6	2,165.0	1,657.8	507.2
Tennessee	(1)	384.6	184.3	200.3	385.5	192.4	193.1
Texas	+ 1	1,156.2	789.9	366.3	1,144.4	857.4	287.0
Virginia	+11	2,094.2	1,424.0	670.2	1,883.8	1,273.6	610.2
All States	+ 6	25,613.9	19,485.9	6,128.0	24,108.7	18,520.2	5,588.5

[1] Negligible.

Table 5. *Southern output of wood residues chipped for pulp manufacture, by State and species group, 1965 and 1964*

State	Change from 1964	1965			1964		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Percent	*Thousand cords*					
Alabama	+15	794.2	600.9	193.3	692.0	536.3	155.7
Arkansas	+ 3	581.1	563.0	18.1	565.1	548.7	16.4
Florida	+ 5	277.1	226.6	50.5	262.8	217.5	45.3
Georgia	+ 7	812.8	689.1	123.7	760.7	652.9	107.8
Louisiana	+23	357.5	323.2	34.3	290.5	258.2	32.3
Mississippi	+ 8	384.5	304.0	80.5	355.8	273.8	82.0
North Carolina	+ 6	587.8	463.2	124.6	554.3	436.9	117.4
Oklahoma	+13	53.2	53.2	.	47.0	47.0	.
South Carolina	— 1	457.8	349.6	108.2	464.6	375.7	88.9
Tennessee	— 2	31.3	10.1	21.2	31.9	13.3	18.6
Texas	+15	512.8	467.5	45.3	446.1	404.0	42.1
Virginia	+33	326.8	226.9	99.9	246.3	181.5	64.8
All States	+10	5,176.9	4,277.3	899.6	4,717.1	3,945.8	771.3

Table 6. *Southern output of wood residues chipped for pulp manufacture, by State and type of residue, 1965*

State	All types	Chips			Other residues [1]		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Thousand cords						
Alabama	794.2	782.3	597.4	184.9	11 9	3.5	8.4
Arkansas	581.1	580.4	562.3	18.1	.7	.7	(2)
Florida	277.1	275.9	226.6	49.3	1.2		1 2
Georgia	812.8	809.5	689.0	120.5	3.3	.1	3.2
Louisiana	357.5	347.3	313.9	33.4	10.2	9.3	.9
Mississippi	384.5	362.8	289.0	73.8	21.7	15.0	6.7
North Carolina	587.8	571.9	462.5	109.4	15.9	.7	15.2
Oklahoma	53.2	53.2	53.2	.			
South Carolina	457.8	453.2	348.8	104.4	4.6	.8	3.8
Tennessee	31.3	31.2	10.1	21.1	.1		.1
Texas	512.8	507.1	467.5	39.6	5.7		5.7
Virginia	326.8	323.6	226.9	96.7	3.2	.	3.2
All States	5,176.9	5,098.4	4,247.2	851.2	78.5	30.1	48.4

[1] Veneer cores, pole and piling trim, cull crossties, sawdust, secondary residues.
[2] Negligible.

Table 7. *Southern pulpwood production by Experiment Station territory, 1965*

Station and source of wood	All species	Pine	Hardwood
		Standard cords	
Southeastern			
Roundwood	14,479,753	11,925,587	2,554,166
Residues	2,462,370	1,955,411	506,959
Total	16,942,123	13,880,998	3,061,125
Southern			
Roundwood	11,134,155	7,560,346	3,573,809
Residues	2,714,524	2,321,809	392,715
Total	13,848,679	9,882,155	3,966,524
All States			
Roundwood	25,613,908	19,485,933	6,127,975
Residues	5,176,894	4,277,220	899,674
Total	30,790,802	23,763,153	7,027,649

Table 8. *Round pulpwood production in Alabama, 1965*

County	All species	Pine	Hardwood
		Standard cords	
Autauga	7,063	3,351	3,712
Baldwin	200,750	165,222	35,528
Barbour	64,013	53,923	10,090
Bibb	36,810	31,598	5,212
Blount	21,393	21,306	87
Bullock	32,113	31,256	857
Butler	111,942	75,196	36,746
Calhoun	51,729	48,936	2,793
Chambers	89,610	77,860	11,750
Cherokee	21,810	14,134	7,676
Chilton	59,812	46,070	13,742
Choctaw	197,157	121,126	76,031
Clarke	178,548	86,855	91,693
Clay	51,098	43,721	7,377
Cleburne	49,035	44,994	4,041
Coffee	41,924	32,242	9,682
Colbert	2,512	2,430	82
Conecuh	83,548	59,326	24,222
Coosa	83,923	71,546	12,377
Covington	111,535	83,812	27,723
Crenshaw	71,788	50,903	20,885
Cullman	14,407	14,370	37
Dale	87,693	72,975	14,718
Dallas	83,872	44,818	39,054
De Kalb	21,170	16,463	4,707
Elmore	48,423	41,907	6,516
Escambia	107,225	86,198	21,027
Etowah	33,748	28,451	5,297
Fayette	40,900	38,739	2,161
Franklin	12,584	12,026	558
Geneva	26,205	20,394	5,811
Greene	43,697	25,167	18,530
Hale	47,991	27,264	20,727
Henry	43,439	34,779	8,660
Houston	20,152	15,317	4,835
Jackson	8,059	5,406	2,653
Jefferson	46,393	44,957	1,436
Lamar	16,200	16,145	55
Lauderdale	5,304	4,219	1,085
Lawrence	1,658	1,658	
Lee	77,802	71,612	6,190
Limestone	2,702	2,702	
Lowndes	47,917	31,733	16,184
Macon	14,515	13,880	635
Madison	1,061	1,061	
Marengo	127,270	70,908	56,362
Marion	22,906	22,233	673
Marshall	8,690	8,551	139
Mobile	119,708	93,405	26,303
Monroe	142,355	105,072	37,283
Montgomery	107,122	67,954	39,168
Morgan	1,810	1,810	
Perry	43,562	18,458	25,104
Pickens	73,337	48,222	25,115
Pike	90,473	65,397	25,076
Randolph	66,157	56,754	9,403
Russell	35,517	35,055	462
St. Clair	31,681	29,795	1,886
Shelby	74,376	63,485	10,891
Sumter	104,241	54,571	49,670
Talladega	55,583	51,502	4,081
Tallapoosa	117,208	94,829	22,379
Tuscaloosa	64,119	56,111	8,008
Walker	37,377	36,565	812
Washington	153,272	104,561	48,711
Wilcox	144,741	83,824	60,917
Winston	25,884	25,884	
All counties	4,068,619	3,032,994	1,035,625

Table 9. *Round pulpwood production in Arkansas, 1965*

County	All species	Pine	Hardwood
	Standard cords		
Arkansas	1,584		1,584
Ashley	179,860	112,384	67,476
Baxter			
Benton			
Boone	5	3	2
Bradley	28,685	20,833	7,852
Calhoun	51,631	44,324	7,307
Carroll			
Chicot	15,128		15,128
Clark	52,658	33,257	19,401
Clay			
Cleburne	29	29	
Cleveland	40,565	26,769	13,796
Columbia	93,290	69,964	23,326
Conway	1,730	274	1,456
Craighead	3		3
Crawford			
Crittenden			
Cross			
Dallas	70,633	40,458	30,175
Desha	18,356		18,356
Drew	100,086	36,646	63,440
Faulkner	15	15	
Franklin			
Fulton			
Garland	23,971	17,598	6,373
Grant	133,135	89,341	43,794
Greene			
Hempstead	47,673	28,240	19,433
Hot Spring	40,150	28,211	11,939
Howard	27,347	19,583	7,764
Independence	18		18
Izard			
Jackson			
Jefferson	19,633	12,371	7,262
Johnson	1,737	1,432	305
Lafayette	50,246	35,917	14,329
Lawrence			
Lee	3,404		3,404
Lincoln	27,092	5,120	21,972
Little River	17,806	9,843	7,963
Logan	2,676	2,069	607
Lonoke			
Madison			
Marion			
Miller	20,669	13,748	6,921
Mississippi			
Monroe			
Montgomery	28,481	16,679	11,802
Nevada	35,774	25,413	10,361
Newton	81	81	
Ouachita	94,127	78,150	15,977
Perry	1,277	1,192	85
Phillips	670	84	586
Pike	38,439	24,344	14,095
Poinsett			
Polk	13,459	2,334	11,125
Pope	16,007	12,094	3,913
Prairie			
Pulaski	3,613	2,973	640
Randolph	6	3	3
St. Francis			
Saline	33,972	22,236	11,736
Scott	8	3	5
Searcy	14	14	
Sebastian	4	4	
Sevier	22,434	8,368	14,066
Sharp			
Stone			
Union	145,588	121,857	23,731
Van Buren	276	276	
Washington			
White	209		209
Woodruff			
Yell	6,882	4,395	2,487
All counties	1,511,136	968,929	542,207

Table 10. *Round pulpwood production in Florida, 1965*

County	All species	Pine	Hardwood
	Standard cords		
Alachua	32,580	26,726	5,854
Baker	70,099	69,929	170
Bay	64,194	63,513	681
Bradford	69,295	65,043	4,252
Brevard	4,068	4,068	
Broward			
Calhoun	47,284	43,431	3,853
Charlotte	4,454	4,454	
Citrus	7,405	5,367	2,038
Clay	71,818	66,439	5,379
Collier	6,468	6,468	
Columbia	76,343	69,439	6,904
Dade	4,315	4,315	
De Soto	1,862	1,862	
Dixie	114,083	71,224	42,859
Duval	95,851	92,271	3,580
Escambia	73,899	68,075	5,824
Flagler	56,027	48,448	7,579
Franklin	26,727	26,710	17
Gadsden	41,159	36,167	4,992
Gilchrist	683	620	63
Glades	19,291	19,291	
Gulf	30,201	29,982	219
Hamilton	58,697	47,345	11,352
Hardee	3,580	3,580	
Hendry	2,509	2,509	
Hernando	18,221	14,955	3,266
Highlands	4,961	4,961	
Hillsborough	6,357	6,357	
Holmes	48,082	39,786	8,296
Indian River	343	343	
Jackson	68,474	46,741	21,733
Jefferson	36,129	32,443	3,686
Lafayette	47,299	33,894	13,405
Lake	13,364	10,694	2,670
Lee	3,160	3,160	
Leon	37,470	36,777	693
Levy	64,138	56,414	7,724
Liberty	69,209	68,040	1,169
Madison	59,204	58,212	992
Manatee	5,585	5,585	
Marion	92,805	84,943	7,862
Martin	15,156	15,156	
Monroe			
Nassau	185,082	155,313	29,769
Okaloosa	22,907	18,400	4,507
Okeechobee	3,351	3,351	
Orange	1,364	1,364	
Osceola	9,479	9,479	
Palm Beach	2,798	2,798	
Pasco	12,233	12,233	
Pinellas	130	130	
Polk	48,752	48,697	55
Putnam	92,235	77,429	14,806
St. Johns	81,047	72,223	8,824
St. Lucie			
Santa Rosa	90,497	87,604	2,893
Sarasota	4,832	4,832	
Seminole	14,981	14,923	58
Sumter	8,008	7,989	19
Suwannee	43,140	37,372	5,768
Taylor	173,098	167,763	5,335
Union	23,262	21,245	2,017
Volusia	66,719	64,364	2,355
Wakulla	33,967	33,589	378
Walton	53,962	42,036	11,926
Washington	52,576	45,973	6,603
All counties	2,597,269	2,324,844	272,425

Table 11. *Round pulpwood production in Georgia, 1965*

County	All species	Pine	Hardwood
	Standard cords		
Appling	83,120	81,232	1,888
Atkinson	53,404	51,100	2,304
Bacon	47,135	46,554	581
Baker	18,219	10,129	8,090
Baldwin	55,104	51,238	3,866
Banks	7,566	7,566	
Barrow	3,742	3,742	
Bartow	24,362	21,569	2,793
Ben Hill	36,571	33,220	3,351
Berrien	43,920	40,428	3,492
Bibb	24,310	20,381	3,929
Bleckley	15,681	7,467	8,214
Brantley	76,733	71,302	5,431
Brooks	25,020	21,264	3,756
Bryan	87,610	85,386	2,224
Bulloch	41,756	33,203	8,553
Burke	25,518	18,666	6,852
Butts	52,638	48,771	3,867
Calhoun	22,899	20,419	2,480
Camden	156,760	135,843	20,917
Candler	16,696	13,953	2,743
Carroll	39,118	38,578	540
Catoosa	5,516	4,779	737
Charlton	82,034	77,146	4,888
Chatham	15,996	10,095	5,901
Chattahoochee	33,929	32,646	1,283
Chattooga	13,122	10,669	2,453
Cherokee	35,736	35,255	481
Clarke	1,659	1,659	
Clay	12,842	9,881	2,961
Clayton	2,966	2,966	
Clinch	172,504	172,110	394
Cobb	22,494	22,144	350
Coffee	62,799	57,477	5,322
Colquitt	19,427	18,708	719
Columbia	41,084	35,052	6,032
Cook	19,241	18,416	825
Coweta	38,442	36,300	2,142
Crawford	42,724	37,651	5,073
Crisp	25,681	24,545	1,136
Dade	488	450	38
Dawson	4,945	4,945	
Decatur	29,915	24,562	5,353
De Kalb	2,317	2,298	19
Dodge	77,092	62,213	14,879
Dooly	9,524	7,968	1,556
Dougherty	69,496	66,250	3,246
Douglas	17,222	16,567	655
Early	27,946	24,040	3,906
Echols	137,387	137,029	358
Effingham	44,629	34,407	10,222
Elbert	51,012	49,325	1,687
Emanuel	52,949	46,596	6,353
Evans	51,248	50,225	1,023
Fannin	6,182	5,201	981
Fayette	18,706	18,321	385
Floyd	19,346	13,460	5,886
Forsyth	14,480	14,455	25
Franklin	9,904	9,635	269
Fulton	7,725	7,625	100
Gilmer	7,560	6,849	711
Glascock	4,161	3,795	366
Glynn	75,098	59,225	15,873
Gordon	18,324	16,297	2,027

County	All species	Pine	Hardwood
	Standard cords		
Grady	27,069	20,847	6,222
Greene	62,232	53,669	8,563
Gwinnett	26,401	26,318	83
Habersham	7,928	6,749	1,179
Hall	29,782	28,823	959
Hancock	58,642	52,666	5,976
Haralson	30,081	26,863	3,218
Harris	54,273	50,969	3,304
Hart	3,794	3,794	
Heard	25,143	23,801	1,342
Henry	20,847	19,337	1,510
Houston	31,384	26,594	4,790
Irwin	4,813	3,913	900
Jackson	17,700	17,700	
Jasper	44,917	38,557	6,360
Jeff Davis	70,951	63,730	7,221
Jefferson	28,346	22,009	6,337
Jenkins	19,706	14,515	5,191
Johnson	22,377	10,872	11,505
Jones	71,080	65,789	5,291
Lamar	18,717	16,347	2,370
Lanier	19,752	19,252	500
Laurens	69,382	43,095	26,287
Lee	9,337	9,278	59
Liberty	106,565	90,224	16,341
Lincoln	23,967	20,714	3,253
Long	65,154	62,457	2,697
Lowndes	16,976	15,864	1,112
Lumpkin	2,175	2,175	
McDuffie	17,944	15,542	2,402
McIntosh	41,709	37,888	3,821
Macon	18,944	12,962	5,982
Madison	16,454	14,000	2,454
Marion	34,423	30,306	4,117
Meriwether	40,270	38,683	1,587
Miller	4,934	2,254	2,680
Mitchell	21,595	16,019	5,576
Monroe	59,660	53,057	6,603
Montgomery	15,753	14,470	1,283
Morgan	22,377	20,541	1,836
Murray	19,037	18,022	1,015
Muscogee	22,518	21,160	1,358
Newton	24,302	22,618	1,684
Oconee	19,620	17,253	2,367
Oglethorpe	26,820	25,538	1,282
Paulding	25,611	21,645	3,966
Peach	6,786	6,202	584
Pickens	15,010	14,513	497
Pierce	65,028	61,689	3,339
Pike	10,155	9,678	477
Polk	26,766	21,205	5,561
Pulaski	8,575	5,664	2,911
Putnam	53,078	50,242	2,836
Quitman	42,262	39,918	2,344
Rabun	6,960		6,960
Randolph	29,271	24,767	4,504
Richmond	9,236	5,590	3,646
Rockdale	2,394	2,394	
Schley	11,894	7,914	3,980
Screven	22,029	18,731	3,298
Seminole	12,596	5,277	7,319

Table 11. *Round pulpwood production in Georgia, 1965* (Continued)

County	All species	Pine	Hardwood
	Standard cords		
Spalding	8,984	8,772	212
Stephens	7,077	6,752	325
Stewart	27,900	27,172	728
Sumter	22,038	20,850	1,188
Talbot	71,163	61,804	9,359
Taliaferro	8,568	8,118	450
Tattnall	60,723	55,132	5,591
Taylor	20,887	18,202	2,685
Telfair	66,491	56,210	10,281
Terrell	19,510	19,347	163
Thomas	39,351	29,737	9,614
Tift	9,767	7,597	2,170
Toombs	53,702	45,801	7,901
Towns			
Treutlen	32,356	25,299	7,057
Troup	90,446	84,703	5,743
Turner	5,720	3,610	2,110
Twiggs	38,539	32,624	5,915
Union	2,720	2,049	671
Upson	33,921	31,973	1,948
Walker	15,990	14,597	1,393
Walton	5,798	5,489	309
Ware	139,771	138,172	1,599
Warren	25,546	23,345	2,201
Washington	51,643	38,406	13,237
Wayne	174,127	166,818	7,309
Webster	24,002	23,598	404
Wheeler	40,242	34,878	5,364
White	5,233	5,233	
Whitfield	14,363	13,624	739
Wilcox	22,100	18,556	3,544
Wilkes	43,371	39,025	4,346
Wilkinson	44,357	32,732	11,625
Worth	13,179	12,401	778
All counties	5,346,821	4,776,537	570,284

Table 12. *Round pulpwood production in Louisiana, 1965*

Parish	All species	Pine	Hardwood
	Standard cords		
Acadia	5,982	3,716	2,266
Allen	49,216	40,484	8,732
Ascension	34		34
Assumption			
Avoyelles	3,492	3,334	158
Beauregard	36,500	24,888	11,612
Bienville	135,160	109,333	25,827
Bossier	90,554	58,334	32,220
Caddo	35,359	23,118	12,241
Calcasieu	18,017	10,325	7,692
Caldwell	34,192	29,924	4,268
Cameron			
Catahoula	11,571	4,028	7,543
Claiborne	100,700	78,015	22,685
Concordia	15,085	15	15,070
De Soto	76,629	43,300	33,329
East Baton Rouge	2,689	97	2,592
East Carroll	9,640	67	9,573
East Feliciana	14,165	8,953	5,212
Evangeline	12,201	9,812	2,389
Franklin	3,684	2,894	790
Grant	31,364	22,672	8,692
Iberia			
Iberville	1,283		1,283
Jackson	91,290	80,024	11,266
Jefferson			
Jefferson Davis	536	328	208
Lafayette			
Lafourche			
La Salle	48,898	39,615	9,283
Lincoln	84,595	66,639	17,956
Livingston	133,005	114,737	18,268
Madison	6,695		6,695
Morehouse	66,047	33,022	33,025
Natchitoches	58,982	37,346	21,636
Orleans			
Ouachita	48,215	36,510	11,705
Plaquemines	5		5
Pointe Coupee	15,149		15,149
Rapides	71,932	57,241	14,691
Red River	32,119	19,998	12,121
Richland	874	181	693
Sabine	73,999	48,336	25,663
St. Bernard			
St. Charles	5		5
St. Helena	30,689	27,067	3,622
St. James	348		348
St. John the Baptist			
St. Landry	10,817	1,053	9,764
St. Martin	2,172		2,172
St. Mary			
St. Tammany	44,942	40,585	4,357
Tangipahoa	47,352	39,704	7,648
Tensas	9,829		9,829
Terrebonne			
Union	203,484	164,989	38,495
Vermilion			
Vernon	28,613	23,834	4,779
Washington	93,195	77,071	16,124
Webster	61,347	41,630	19,717
West Baton Rouge	843		843
West Carroll	544	312	232
West Feliciana	4,986	358	4,628
Winn	137,310	116,851	20,459
All parishes	2,096,334	1,540,740	555,594

Table 13. *Round pulpwood production in Mississippi, 1965*

County	All species	Pine	Hardwood
	Standard cords		
Adams	12,541	1,464	11,077
Alcorn	9,032	7,072	1,960
Amite	19,257	11,432	7,825
Attala	22,323	6,791	15,532
Benton	2,715	2,365	350
Bolivar	9,264		9,264
Calhoun	10,859	9,852	1,007
Carroll	10,205	1,713	8,492
Chickasaw	22,375	19,588	2,787
Choctaw	12,100	3,712	8,388
Claiborne	39,886	5,656	34,230
Clarke	105,934	65,823	40,111
Clay	14,176	12,436	1,740
Coahoma			
Copiah	38,552	19,188	19,364
Covington	29,419	12,201	17,218
De Soto			
Forrest	39,295	23,102	16,193
Franklin	19,941	11,483	8,458
George	45,074	34,934	10,140
Greene	83,433	48,448	34,985
Grenada	3,111	1,027	2,084
Hancock	37,031	33,353	3,678
Harrison	21,139	19,178	1,961
Hinds	31,280	12,455	18,825
Holmes	26,693	4,173	22,520
Humphreys	3,035		3,035
Issaquena	1,161		1,161
Itawamba	18,373	15,794	2,579
Jackson	40,326	35,291	5,035
Jasper	62,407	35,647	26,760
Jefferson	26,454	9,891	16,563
Jefferson Davis	10,461	5,446	5,015
Jones	57,112	22,047	35,065
Kemper	28,179	20,031	8,148
Lafayette	23,816	12,680	11,136
Lamar	31,314	17,126	14,188
Lauderdale	74,426	49,868	24,558
Lawrence	22,729	11,388	11,341
Leake	20,608	8,646	11,962
Lee	2,688	2,246	442
Leflore	5,535	34	5,501
Lincoln	34,481	16,954	17,527
Lowndes	7,631	4,979	2,652
Madison	9,077	2,638	6,439
Marion	66,295	30,428	35,867
Marshall	5,358	2,870	2,488
Monroe	4,264	2,736	1,528
Montgomery	4,224	1,292	2,932
Neshoba	24,451	12,070	12,381
Newton	36,571	19,198	17,373
Noxubee	25,540	15,641	9,899
Oktibbeha	10,247	8,190	2,057
Panola	4,951	133	4,818
Pearl River	27,784	20,475	7,309
Perry	44,041	32,482	11,559
Pike	21,527	12,364	9,163
Pontotoc	6,019	3,413	2,606
Prentiss	14,596	11,475	3,121
Quitman	211		211
Rankin	32,776	14,519	18,257
Scott	20,721	9,589	11,132
Sharkey	3,450		3,450
Simpson	37,494	20,269	17,225
Smith	19,761	7,962	11,799
Stone	44,556	28,383	16,173
Sunflower	1,517		1,517
Tallahatchie	244	7	237
Tate	398	106	292
Tippah	12,472	11,852	620
Tishomingo	26,866	21,752	5,114
Tunica	7,741		7,741
Union	6,737	6,247	490
Walthall	23,741	9,763	13,978
Warren	19,793	206	19,587
Washington	9,463		9,463
Wayne	77,203	54,917	22,286
Webster	13,586	8,851	4,735
Wilkinson	13,261	3,408	9,853
Winston	34,120	18,244	15,876
Yalobusha	14,619	7,814	6,805
Yazoo	16,723	645	16,078
All counties	1,878,769	1,035,453	843,316

Table 14. *Round pulpwood production in North Carolina, 1965*

County	All species	Pine	Hardwood
	Standard cords		
Alamance	3,338	2,828	510
Alexander	4,777	4,348	429
Alleghany			
Anson	40,502	26,196	14,306
Ashe			
Avery	263		263
Beaufort	144,523	127,682	16,841
Bertie	48,327	31,463	16,864
Bladen	81,314	57,144	24,170
Brunswick	99,563	82,232	17,331
Buncombe	43,583	15,665	27,918
Burke	19,311	13,426	5,885
Cabarrus	5,458	4,363	1,095
Caldwell	11,551	8,188	3,363
Camden	663	622	41
Carteret	22,116	21,621	495
Caswell	6,666	6,081	585
Catawba	2,311	1,844	467
Chatham	45,254	27,317	17,937
Cherokee	29,665	21,195	8,470
Chowan	8,264	5,141	3,123
Clay	412	412	
Cleveland	12,826	9,278	3,548
Columbus	88,508	66,562	21,946
Craven	63,373	59,631	3,742
Cumberland	50,743	43,824	6,919
Currituck	3,833	2,800	1,033
Dare	5,285	4,638	647
Davidson	10,678	10,294	384
Davie	7,891	7,442	449
Duplin	41,093	35,506	5,587
Durham	23,184	20,222	2,962
Edgecombe	6,248	5,041	1,207
Forsyth	11,285	10,485	800
Franklin	48,835	38,374	10,461
Gaston	14,342	9,901	4,441
Gates	18,753	10,619	8,134
Graham	3,451	946	2,505
Granville	12,601	11,436	1,165
Greene	3,317	3,317	
Guilford	20,293	19,355	938
Halifax	35,861	25,635	10,226
Harnett	22,754	15,717	7,037
Haywood	10,840	2,352	8,488
Henderson	21,816	5,975	15,841
Hertford	33,066	19,355	13,711
Hoke	14,176	10,328	3,848
Hyde	19,185	16,408	2,777
Iredell	26,425	21,583	4,842
Jackson	37,177	1,417	35,760
Johnston	26,962	20,646	6,316
Jones	34,511	31,733	2,778
Lee	15,046	10,422	4,624
Lenoir	3,443	3,436	7
Lincoln	12,369	8,761	3,608
McDowell	17,611	9,170	8,441
Macon	9,714		9,714
Madison	4,211	1,901	2,310
Martin	30,233	28,441	1,792
Mecklenburg	19,617	13,167	6,450
Mitchell	2,311		2,311
Montgomery	16,696	11,914	4,782
Moore	28,959	24,082	4,877
Nash	22,828	18,978	3,850
New Hanover	4,985	4,909	76
Northampton	19,254	17,860	1,394
Onslow	78,631	68,014	10,617
Orange	8,101	6,744	1,357
Pamlico	22,678	18,907	3,771
Pasquotank	10,742	9,974	768
Pender	64,664	47,886	16,778
Perquimans	22,055	18,313	3,742
Person	10,480	10,419	61
Pitt	16,310	14,953	1,357
Polk	9,225	3,614	5,611
Randolph	8,877	6,972	1,905
Richmond	25,084	19,602	5,482
Robeson	34,431	25,097	9,334
Rockingham	17,076	15,030	2,046
Rowan	8,440	6,735	1,705
Rutherford	34,794	18,408	16,386
Sampson	42,945	37,896	5,049
Scotland	9,083	5,938	3,145
Stanly	20,578	16,199	4,379
Stokes	4,243	4,014	229
Surry	10,655	9,737	918
Swain	8,262	3,660	4,602
Transylvania	11,297	784	10,513
Tyrrell	16,038	13,844	2,194
Union	35,791	24,760	11,031
Vance	11,718	8,208	3,510
Wake	49,193	38,130	11,063
Warren	51,364	45,373	5,991
Washington	24,312	14,637	9,675
Watauga			
Wayne	17,782	14,481	3,301
Wilkes	9,738	9,492	246
Wilson	9,068	7,617	1,451
Yadkin	8,972	8,173	799
Yancey	812		812
All counties	2,267,889	1,705,240	562,649

Table 15. *Round pulpwood production in Oklahoma, 1965*

County [1]	All species	Pine	Hardwood
	Standard cords		
Canadian	749		749
Carter	483		483
Choctaw	1,437		1,437
Delaware	1,124		1,124
Garvin	3,667		3,667
Grady	198		198
Le Flore	1,312		1,312
Love	931		931
McClain	220		220
McCurtain	15,051	8,019	7,032
Mayes	1,124		1,124
Murray	799		799
Pushmataha	77		77
Rogers	3,594		3,594
Stephens	4,586		4,586
Tulsa	2,695		2,695
Wagoner	449		449
All counties	38,496	8,019	30,477

[1] Counties with no pulpwood production are omitted.

Table 16. *Round pulpwood production in South Carolina, 1965*

County	All species	Pine	Hardwood
	Standard cords		
Abbeville	49,910	42,120	7,790
Aiken	71,345	58,768	12,577
Allendale	21,873	15,828	6,045
Anderson	27,329	20,413	6,916
Bamberg	19,945	12,463	7,482
Barnwell	36,718	33,389	3,329
Beaufort	5,433	3,896	1,537
Berkeley	84,389	60,650	23,739
Calhoun	8,068	5,558	2,510
Charleston	51,268	35,131	16,137
Cherokee	11,744	10,258	1,486
Chester	72,513	56,320	16,193
Chesterfield	48,388	32,172	16,216
Clarendon	21,713	17,272	4,441
Colleton	62,534	42,565	19,969
Darlington	16,237	9,107	7,130
Dillon	17,298	13,691	3,607
Dorchester	39,700	24,450	15,250
Edgefield	95,371	79,575	15,796
Fairfield	154,570	134,406	20,164
Florence	39,936	25,821	14,115
Georgetown	93,888	68,088	25,800
Greenville	17,474	13,160	4,314
Greenwood	56,572	48,097	8,475
Hampton	63,585	53,509	10,076
Horry	52,833	41,473	11,360
Jasper	43,523	40,117	3,406
Kershaw	104,004	75,704	28,300
Lancaster	70,491	55,334	15,157
Laurens	58,316	48,857	9,459
Lee	15,015	11,383	3,632
Lexington	32,559	27,583	4,976
McCormick	27,237	26,092	1,145
Marion	21,536	13,535	8,001
Marlboro	27,756	13,305	14,451
Newberry	95,494	84,225	11,269
Oconee	34,317	27,197	7,120
Orangeburg	31,914	21,522	10,392
Pickens	6,709	4,567	2,142
Richland	52,911	44,316	8,595
Saluda	50,924	39,407	11,517
Spartanburg	25,858	18,879	6,979
Sumter	29,040	23,251	5,789
Union	82,565	71,668	10,897
Williamsburg	53,630	35,588	18,042
York	69,195	54,284	14,911
All counties	2,173,628	1,694,994	478,634

Table 17. *Round pulpwood production in Tennessee, 1965*

County	All species	Pine	Hardwood
	Standard cords		
Anderson	7,594	5,065	2,529
Bedford			
Benton	192	192	
Bledsoe	4,882	3,382	1,500
Blount	15,353	10,587	4,766
Bradley	16,654	12,291	4,363
Campbell	7,954	5,975	1,979
Cannon			
Carroll	362	351	11
Carter	8,033	1,469	6,564
Cheatham			
Chester	1,823	1,509	314
Claiborne	2,475	1,067	1,408
Clay			
Cocke	12,010	9,930	2,080
Coffee			
Crockett	258	258	
Cumberland	24,980	5,675	19,305
Davidson			
Decatur	1,016	665	351
De Kalb			
Dickson			
Dyer			
Fayette	684	148	536
Fentress	6,271	4,513	1,758
Franklin			
Gibson	50	50	
Giles			
Grainger	518		518
Greene	1,043		1,043
Grundy	1,994	1,994	
Hamblen			
Hamilton	9,828	5,070	4,758
Hancock	196		196
Hardeman	4,938	4,368	570
Hardin	7,833	2,877	4,956
Hawkins	6,213	382	5,831
Haywood	6		6
Henderson	5,167	5,033	134
Henry			
Hickman			
Houston			
Humphreys			
Jackson			
Jefferson	57		57
Johnson	1,820		1,820
Knox	6,951	3,347	3,604
Lake			
Lauderdale	3,411		3,411
Lawrence	4	4	
Lewis	12	6	6
Lincoln			
Loudon	5,360	2,769	2,591
McMinn	20,931	14,481	6,450
McNairy	7,024	5,225	1,799
Macon			
Madison	580	520	60
Marion	135	135	
Marshall			
Maury			
Meigs	12,365	7,170	5,195
Monroe	24,289	12,036	12,253
Montgomery			
Moore			
Morgan	33,100	5,534	27,566
Obion			
Overton			
Perry	1,184	336	848
Pickett			
Polk	19,343	11,132	8,211
Putnam	2,081	1,787	294
Rhea	17,294	5,993	11,301
Roane	12,699	6,908	5,791
Robertson		...	...
Rutherford			
Scott	13,879	4,296	9,583
Sequatchie	2,447	1,084	1,363
Sevier	4,248	4,096	152
Shelby	2,287	189	2,098
Smith			
Stewart			
Sullivan	10,155		10,155
Sumner			
Tipton	10,234		10,234
Trousdale			
Unicoi	5,584	1,469	4,115
Union	10,379	9,033	1,346
Van Buren			
Warren			
Washington	7,172	3,439	3,733
Wayne	468	304	164
Weakley	37	37	
White	783	153	630
Williamson			
Wilson			
All counties	384,640	184,334	200,306

Table 18. *Round pulpwood production in Texas, 1965*

County [1]	All species	Pine	Hardwood
	----- *Standard cords* -----		
Anderson	1,547	1,547	
Angelina	69,800	46,469	23,331
Austin	24		24
Bowie	19,271	14,462	4,809
Brazos	446	50	396
Burleson	505		505
Camp	1,375	3	1,372
Cass	52,829	36,282	16,547
Chambers	1,719	1,516	203
Cherokee	26,211	25,536	675
Colorado	200		200
Ellis	104		104
Fort Bend	43		43
Franklin	58		58
Freestone	146		146
Gregg	1,599	33	1,566
Grimes	8,516	8,032	484
Hardin	47,166	22,228	24,938
Harris	36,803	29,185	7,618
Harrison	24,157	14,753	9,404
Henderson	3	3	
Hopkins	3	3	
Houston	32,451	25,199	7,252
Jasper	67,731	43,008	24,723
Jefferson	191	153	38
Lamar	891		891
Leon	658		658
Liberty	65,344	37,293	28,051
Marion	22,228	11,295	10,933
Montgomery	63,103	44,959	18,144
Morris	3,835	63	3,772
Nacogdoches	40,797	34,020	6,777
Newton	47,298	22,172	25,126
Orange	17,447	7,469	9,978
Panola	39,834	29,716	10,118
Polk	94,017	72,507	21,510
Red River	22	19	3
Robertson	280		280
Rusk	13,448	10,113	3,335
Sabine	29,602	27,187	2,415
San Augustine	45,363	26,542	18,821
San Jacinto	33,746	18,195	15,551
Shelby	63,003	47,270	15,733
Smith	1,330	1,058	272
Titus	52		52
Trinity	54,940	47,366	7,574
Tyler	60,115	41,119	18,996
Upshur	31,140	19,018	12,122
Walker	31,590	22,150	9,440
Waller	520	54	466
Wood	2,660	1,830	830
All counties	1,156,161	789,877	366,284

[1] Counties with no pulpwood production are omitted.

Table 19. *Round pulpwood production in Virginia, 1965*

County [1]	All species	Pine	Hardwood
	Standard cords		
Accomack	19,820	19,812	8
Albemarle	44,669	22,953	21,716
Alleghany	46,101	7,178	38,923
Amelia	62,936	58,042	4,894
Amherst	51,256	18,197	33,059
Appomattox	58,731	22,374	36,357
Arlington	10	10	
Augusta	15,388	3,389	11,999
Bath	30,063	3,036	27,027
Bedford	44,405	25,787	18,618
Bland	499	499	
Botetourt	26,162	6,950	19,212
Brunswick	75,269	55,898	19,371
Buchanan	3		3
Buckingham	120,824	71,946	48,878
Campbell	57,156	32,073	25,083
Caroline	19,851	18,655	1,196
Carroll	4,873	4,181	692
Charles City	23,165	16,599	6,566
Charlotte	37,377	30,605	6,772
Chesterfield	35,693	27,907	7,786
Clarke	5,338	4,557	781
Craig	20,376	4,516	15,860
Culpeper	4,331	4,319	12
Cumberland	27,774	21,591	6,183
Dickenson	38		38
Dinwiddie	61,743	50,857	10,886
Elizabeth City	9	6	3
Essex	21,303	20,718	585
Fairfax	4,516	4,505	11
Fauquier	14,502	13,748	754
Floyd	2,743	2,737	6
Fluvanna	21,360	14,887	6,473
Franklin	26,904	20,923	5,981
Frederick	11,373	8,982	2,391
Giles	345	345	
Gloucester	26,256	24,849	1,407
Goochland	38,024	33,347	4,677
Grayson	739	3	736
Greene	2,531	2,078	453
Greensville	37,108	28,189	8,919
Halifax	17,050	13,633	3,417
Hanover	10,409	9,854	555
Henrico	10,992	9,151	1,841
Henry	22,781	22,607	174
Highland	10,278	1,281	8,997
Isle of Wight	15,746	7,982	7,764
James City	12,640	11,997	643
King and Queen	39,240	36,733	2,507
King George	989	795	194
King William	34,594	32,906	1,688
Lancaster	8,669	8,048	621
Lee	2,798	12	2,786
Loudoun	875	875	
Louisa	26,567	19,611	6,956
Lunenburg	25,840	22,328	3,512
Madison	1,215	1,147	68
Mathews	22,331	20,994	1,337
Mecklenburg	23,876	20,394	3,482
Middlesex	12,146	11,199	947
Montgomery	3,701	3,163	538
Nansemond	15,246	6,758	8,488
Nelson	39,344	16,043	23,301
New Kent	21,663	18,519	3,144
Norfolk	1,261	774	487
Northampton	390	347	43
Northumberland	5,189	4,973	216
Nottoway	46,852	38,106	8,746
Orange	11,737	10,722	1,015
Page	1,275	1,050	225
Patrick	6,430	6,255	175
Pittsylvania	49,039	40,118	8,921
Powhatan	41,479	36,921	4,558
Prince Edward	66,795	60,240	6,555
Prince George	49,361	38,227	11,134
Prince William	6,740	6,411	329
Princess Anne	754	508	246
Pulaski	2,560	2,487	73
Rappahannock	341	329	12
Richmond	16,509	15,986	523
Roanoke	2,778	1,276	1,502
Rockbridge	59,888	9,188	50,700
Rockingham	8,619	6,230	2,389
Russell	578		578
Scott	9,617	6	9,611
Shenandoah	8,218	6,084	2,134
Smyth	4,948	51	4,897
Southampton	33,499	19,834	13,665
Spotsylvania	24,281	22,324	1,957
Stafford	5,792	5,517	275
Surry	30,016	25,225	4,791
Sussex	75,347	44,015	31,332
Tazewell	3	3	
Warren	3,286	2,192	1,094
Warwick	719	594	125
Washington	9,395		9,395
Westmoreland	8,686	8,610	76
Wise	12,507		12,507
Wythe	2,079	689	1,390
York	6,624	5,402	1,222
All counties	2,094,146	1,423,972	670,174

[1] Includes independent cities.

Table 20. *Mills using southern pulpwood in 1965, by process and capacity*

Location	Map code [1]	Company	Pulping capacity, 24 hours [2]				
			All processes	Sulfate	Groundwood and other mechanical	Semi-chemical	Soda and sulfite
			Tons				
ALABAMA							
Jackson	(1)	Allied Paper Corp.	400	400			
Brewton	(2)	Container Corp. of America	600	600			
Demopolis	(3)	Gulf States Paper Corp.	400	400			
Tuscaloosa	(4)	Gulf States Paper Corp.	450	450			
Mobile	(5)	International Paper Co.	1,315	1,015	300		
Coosa Pines	(6)	Kimberly-Clark Corp. Coosa River Newsprint Div.	1,006	366	640		
Naheola	(7)	Marathon Southern Corp.	750	750			
Mobile	(8)	National Gypsum Co.	300		150	150	
Mobile	(9)	The Ruberoid Co.	48		48		
Mobile	(10)	Scott Paper Co.	1,300	1,300			
		Total	6,569	5,281	1,138	150	
ARKANSAS							
Pine Bluff	(11)	Dierks Paper Co.	150	150			
Crossett	(12)	Georgia-Pacific Corp. Crossett Division—Paper	835	835			
Camden	(13)	International Paper Co.	625	625			
Pine Bluff	(14)	International Paper Co.	1,300	900	400		
		Total	2,910	2,510	400		
FLORIDA							
Jacksonville	(15)	Alton Box Board Co.	600	600			
Foley	(16)	The Buckeye Cellulose Corp.	910	910			
Fernandina Beach	(17)	Container Corp. of America	800	800			
Palatka	(18)	Hudson Pulp and Paper Corp.	850	850			
Panama City	(19)	International Paper Co.	1,230	1,230			
Fernandina Beach	(20)	Rayonier Inc.	375				375
Port St. Joe	(21)	St. Joe Paper Co.	1,200	1,200			
Jacksonville	(22)	St. Regis Paper Co.	1,400	1,400			
Pensacola	(23)	St. Regis Paper Co.	700	700			
		Total	8,065	7,690			375
GEORGIA							
Macon	(24)	Armstrong Cork Co.	400		400		
Brunswick	(25)	Brunswick Pulp and Paper Co.	1,120	1,120			
Savannah	(26)	Certain-teed Products Corp.	65			65	
Augusta	(27)	Continental Can Co., Inc.	350	225		125	
Port Wentworth	(28)	Continental Can Co., Inc.	600	600			
Macon	(29)	Georgia Kraft Co., Macon Div.	825	825			
Rome	(30)	Georgia Kraft Co., Rome Div.	1,400	1,400			
St. Marys	(31)	Gilman Paper Co., St. Marys Kraft Div.	1,000	1,000			
Cedar Springs	(32)	Great Southern Division of Great Northern Paper Co.	875	875			
Valdosta	(33)	Owens-Illinois, Forest Products Div.	790	790			
Jesup	(34)	Rayonier Inc.	675	675			
Savannah	(35)	The Ruberoid Co.	48		48		
Savannah	(36)	Union Camp Corp.	2,900	2,500		400	
		Total	11,048	10,010	448	590	
ILLINOIS							
Alton	(37)	Alton Box Board Co.	250			250	
East St. Louis	(38)	Certain-teed Products Corp.	85		85		
Wilmington	(39)	Lehon Co.	25			25	
		Total	360		85	275	
LOUISIANA							
Shreveport	(40)	Bird and Son, Inc.	60			60	
Elizabeth	(41)	Calcasieu Paper Co., Inc.	240	240			
Hodge	(42)	Continental Can Co. Inc.	650	500		150	
Bogalusa	(43)	Crown Zellerbach Corp.	1,435	1,300		135	
Bastrop	(44)	International Paper Co. (Bastrop Mill)	535			535	
Bastrop	(45)	International Paper Co. (Louisiana Mill)	775	775			
Springhill	(46)	International Paper Co.	1,595	1,595			
West Monroe	(47)	Olin Mathieson Chemical Corp.	650	650			
St. Francisville	(48)	St. Francisville Paper Co.	235		235		
New Orleans	(49)	Southern Johns-Manville Products Corp.	60		60		
		Total	6,235	5,060	295	880	
MARYLAND							
Luke	(50)	West Virginia Pulp and Paper Co.	700	700			
		Total	700	700			

Table 20. *Mills using southern pulpwood in 1965, by process and capacity* (Continued)

Location	Map code[1]	Company	Pulping capacity, 24 hours[2]				
			All processes	Sulfate	Groundwood and other mechanical	Semi-chemical	Soda and sulfite
			Tons				
MISSISSIPPI							
Meridian	(51)	The Flintkote Co.	133		133		
Moss Point	(52)	International Paper Co.	660	660			
Natchez	(53)	International Paper Co.	950	950			
Natchez	(54)	Johns-Manville Products Corp.	350		230	120	
Meridian	(55)	Kroehler Mfg. Co. of Miss., Inc.[3]	80		80		
Laurel	(56)	Masonite Corp.	1,200		1,200		
Greenville	(57)	United States Gypsum Co.	200		200		
		Total	3,573	1,610	1,843	120	
NORTH CAROLINA							
Roanoke Rapids	(58)	Albemarle Paper Co.	890	890			
Canton	(59)	Champion Papers Inc.	1,100	1,100			
Sylva	(60)	The Mead Corp.	275			275	
Riegelwood	(61)	Riegel Paper Corp.	920	920			
Plymouth	(62)	Weyerhaeuser Co., N. C. Div.	1,500	1,150		350	
		Total	4,685	4,060		625	
OHIO							
Chillicothe	(63)	The Mead Corp.	540	540			
		Total	540	540			
OKLAHOMA							
Pryor	(64)	Georgia-Pacific, Bestwall Gypsum Div.	45		45		
Craig	(65)	Dierks Forests, Inc.	270		270		
		Total	315		315		
PENNSYLVANIA							
Roaring Spring	(66)	D. M. Bare Paper Co.	175	175			
Philadelphia	(67)	Barrett Div., Allied Chemical Corp.	160			160	
York	(68)	Certain-teed Products Corp.	80			80	
Erie	(69)	Hammermill Paper Co.	400			61	339
		Total	815	175		301	339
SOUTH CAROLINA							
Catawba	(70)	Bowaters Carolina Corp.	500	400	100		
Georgetown	(71)	International Paper Co.	2,130	1,650		480	
Hartsville	(72)	Sonoco Products Co.	375			375	
Florence	(73)	South Carolina Industries, Inc.	400	400			
Charleston	(74)	West Virginia Pulp and Paper Co.	1,685	1,425		260	
		Total	5,090	3,875	100	1,115	
TENNESSEE							
Calhoun	(75)	Bowaters Southern Paper Corp.	1,475	450	850	175	
Harriman	(76)	The Mead Corp.	170			170	
Kingsport	(77)	The Mead Corp.	225				225
Knoxville	(78)	Southern Extract Co.	150			150	
Counce	(79)	Tennessee River Pulp and Paper Co.	700	700			
		Total	2,720	1,150	850	495	225
TEXAS							
Pasadena	(80)	Champion Papers Inc.	815	750	65		
Evadale	(81)	EasTex, Inc.	900	900			
Dallas	(82)	The Ruberoid Co.	40		40		
Lufkin	(83)	Southland Paper Mills, Inc.	1,250	400	850		
Diboll	(84)	Temple Industries, Fiber Products Div.	195			195	
		Total	3,200	2,050	955	195	
VIRGINIA							
West Point	(85)	The Chesapeake Corp. of Virginia	1,050	1,050			
Hopewell	(86)	Continental Can Co., Inc.	1,000	830		170	
Lynchburg	(87)	The Mead Corp.	180			180	
Big Island	(88)	Owens-Illinois, Forest Products Div.	400			400	
Jarratt	(89)	Southern Johns-Manville Products Corp.	200		200		
Franklin	(90)	Union Camp Corp.	690	690			
Covington	(91)	West Virginia Pulp and Paper Co.	1,300	1,050		250	
		Total	4,280	3,620	200	1,000	
		All States	61,645	48,331	6,629	5,746	939

[1] Corresponds to numbers at mill locations in figure 7.
[2] Southern Pulp and Paper Manufacturer, vol. 28, No. 10 (Oct. 1, 1965); and other sources.
[3] Operates exclusively on secondary wood residues.

Table 21. *Pulpmills under construction in the South*

Location	Map code[1]	Company	Pulp capacity 24 hrs.[2]
			Tons
ALABAMA			
Cottonton	(92)	Alabama Kraft Co., Div. of Ga. Kraft Co.	800
Riverdale	(93)	Hammermill Paper Co., Riverdale Div.	400
Prattville	(94)	Union Camp Corp.	700
ARKANSAS			
Morrilton	(95)	Arkansas Kraft Corp.	200
GEORGIA			
Augusta	(96)	Cox Newsprint, Inc.	280
LOUISIANA			
St. Francisville	(97)	Crown Zellerbach Corp.	500
MISSISSIPPI			
Vicksburg	(98)	International Paper Co.	1,000
TEXAS			
Sheldon	(99)	Southland Paper Mills, Inc.	400

[1] Corresponds to numbers at mill location in figure 7.
[2] Southern Pulp and Paper Manufacturer, vol. 28, No. 10 (Oct. 1, 1965); and other sources.

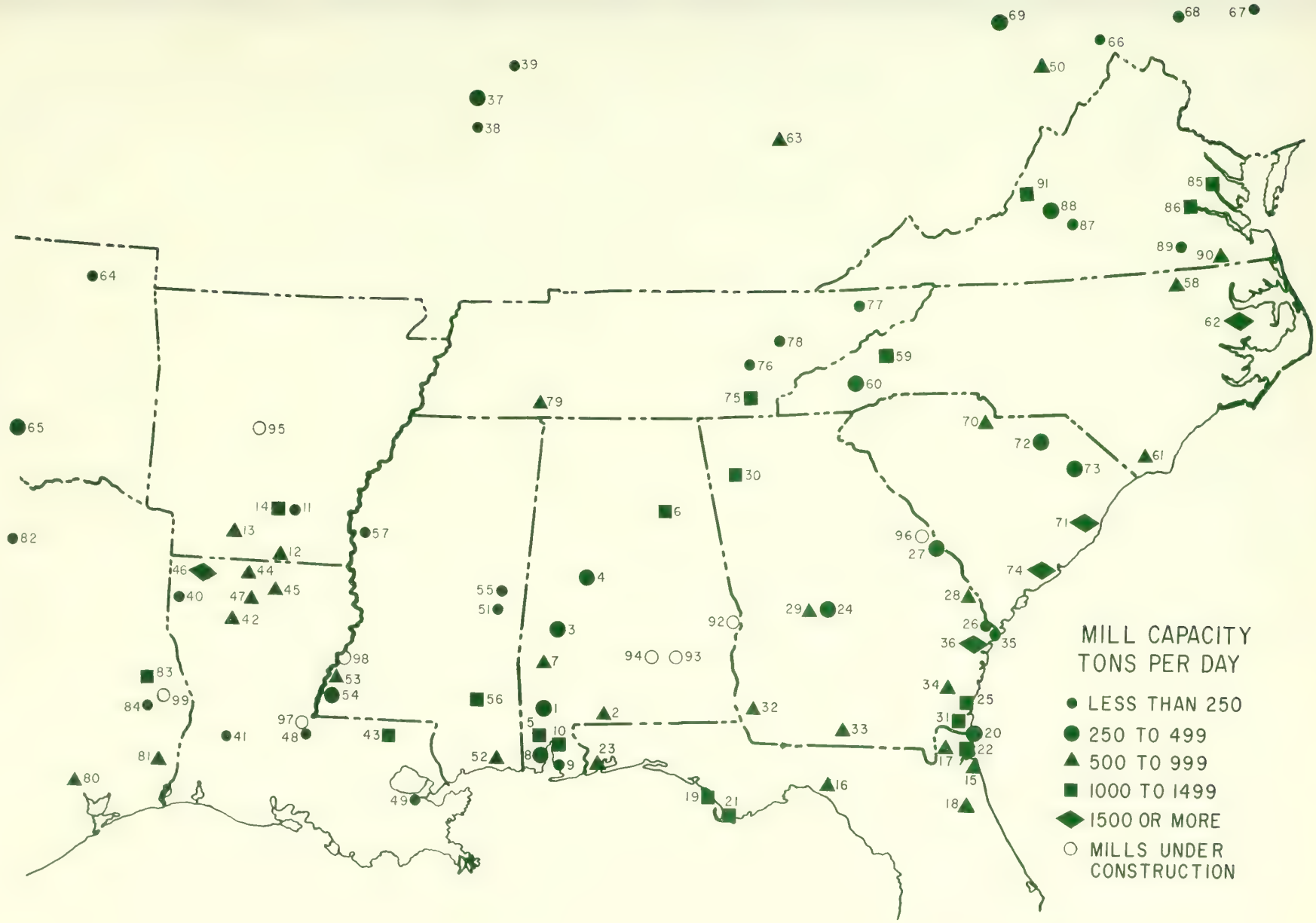


Figure 7. *Mills using southern pulpwood in 1965, and those under construction. Numbers at mill locations correspond to numbers in table 20.*

U. S. FOREST SERVICE
RESOURCE BULLETIN SE-7

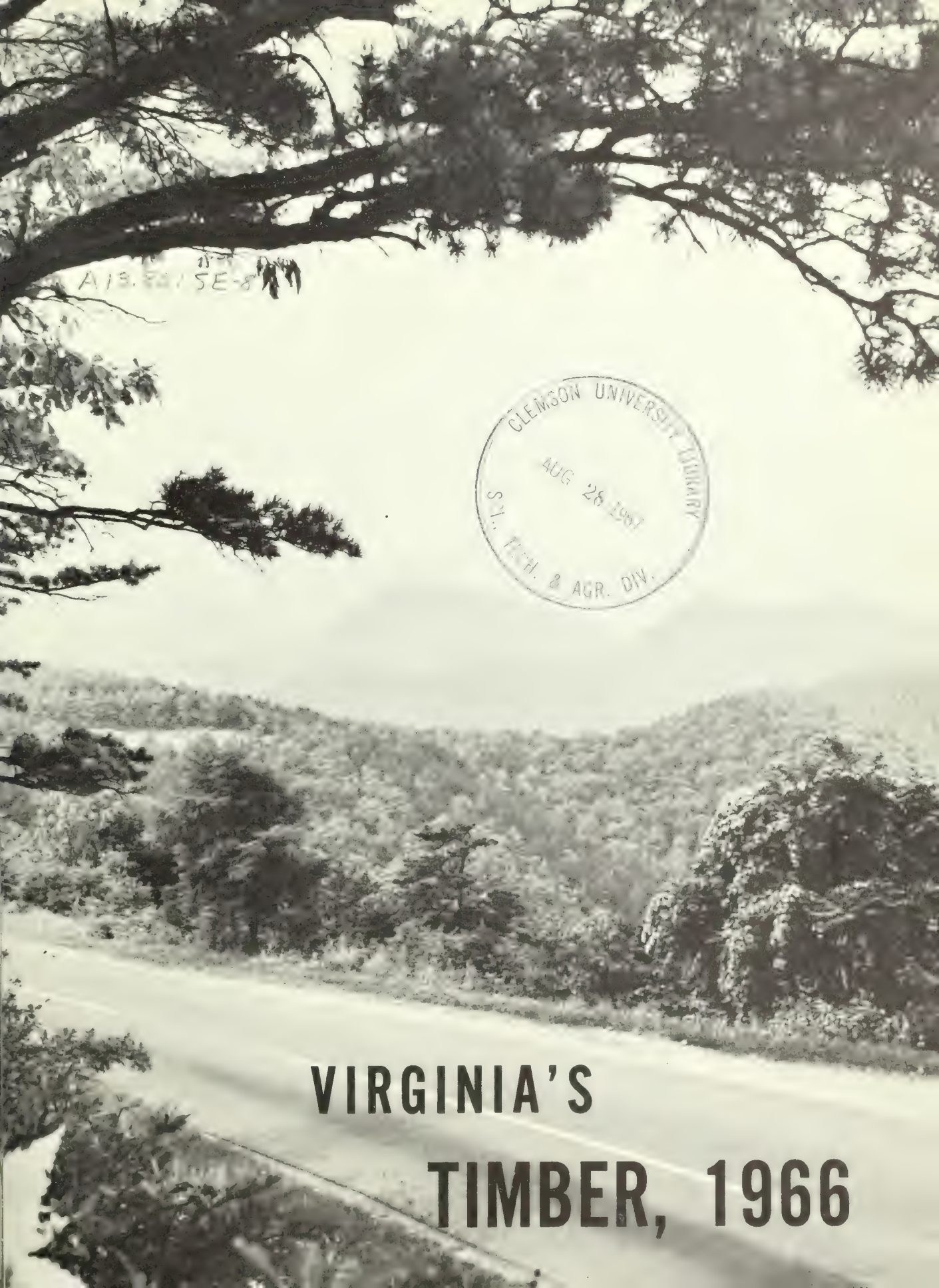
SOUTHEASTERN FOREST EXPERIMENT STATION
Asheville, North Carolina

Forest Service, U. S. Department of Agriculture

1966

A13.52/SE-8

CLEMSON UNIVERSITY LIBRARY
AUG 28 1967
S.C. TECH. & AGR. DIV.



VIRGINIA'S TIMBER, 1966

Foreword

This report presents the principal findings of the third Forest Survey of Virginia's timber resource. The resurvey was started in November 1964 and completed in August 1966. Findings of the two previous surveys, completed in 1940 and 1957, provide the basis for measuring the changes that have occurred and the trends that have developed during the past 26 years.

The Virginia Forest Survey is part of the nationwide effort to maintain a current inventory of the Nation's timber supply as authorized by Congress in the McSweeney-McNary Forest Research Act of 1928. The regional experiment stations of the U. S. Forest Service conduct the periodic surveys that are necessary to keep basic information up to date.

The Southeastern Forest Experiment Station gratefully acknowledges the cooperation received from the Virginia Division of Forestry which provided personnel and equipment for one field crew in this latest resurvey. The Station also wishes to acknowledge the assistance received from personnel of the George Washington and Jefferson National Forests in the collection of field data on National Forest lands. Appreciation is expressed to all Station personnel who participated in the field and office work.

Joe P. McClure, project leader of the Forest Survey in the Southeast, organized and coordinated the various phases of the Virginia Survey. William H. B. Haines was in charge of computations and also supervised the preparation and interpretation of aerial photographs used to determine land use and the sample locations. Richard L. Welch was responsible for compiling timber cut and product information. Noel D. Cost supervised the collection of all field data, and Herbert A. Knight was in charge of the analysis and reporting.

The discussion of other recognized forest values in Virginia—water, fish and wildlife, and recreation—is beyond the scope of this report. The purpose of this publication is to appraise the timber situation.

Walton R. Smith

WALTON R. SMITH, Assistant Director
Division of Marketing, Utilization, and
Resources Research

U. S. FOREST SERVICE
RESOURCE BULLETIN SE-8

VIRGINIA'S TIMBER, 1966

by

HERBERT A. KNIGHT, Associate Resource Analyst

and

JOE P. McCLURE, Principal Resource Analyst

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SOUTHEASTERN FOREST EXPERIMENT STATION
ASHEVILLE, NORTH CAROLINA
1967

Contents

	Page
Highlights	1
Timber trends	3
Little net change in forest area	3
Ownership patterns change	3
Hardwoods occupy more area	4
Average stand still in poor condition	4
More timber volume but less softwood	4
Imbalance between growth and cut	5
Timber products output	7
Saw logs are still the leading product	7
Pulpwood production at an all-time high	7
Output of veneer logs is down	9
Miscellaneous products	9
Plant residues	9
Industry concentrated in coastal plain and southern piedmont	9
Fuelwood consumption continues to decline	9
Timber supply outlook	11
Prospective available cut	11
Potential available cut	14
Basis for projections	14
Timber quality	15
Management opportunities	17
Growth far below potential	17
Stand improvement	17
Regeneration	17
Planting opportunity	17
Better protection	18
More complete utilization	18
General outlook	18
Appendix	21
Accuracy of the survey	21
How the forest inventory is made	21
Definitions of terms	22
Index to detailed tables	26

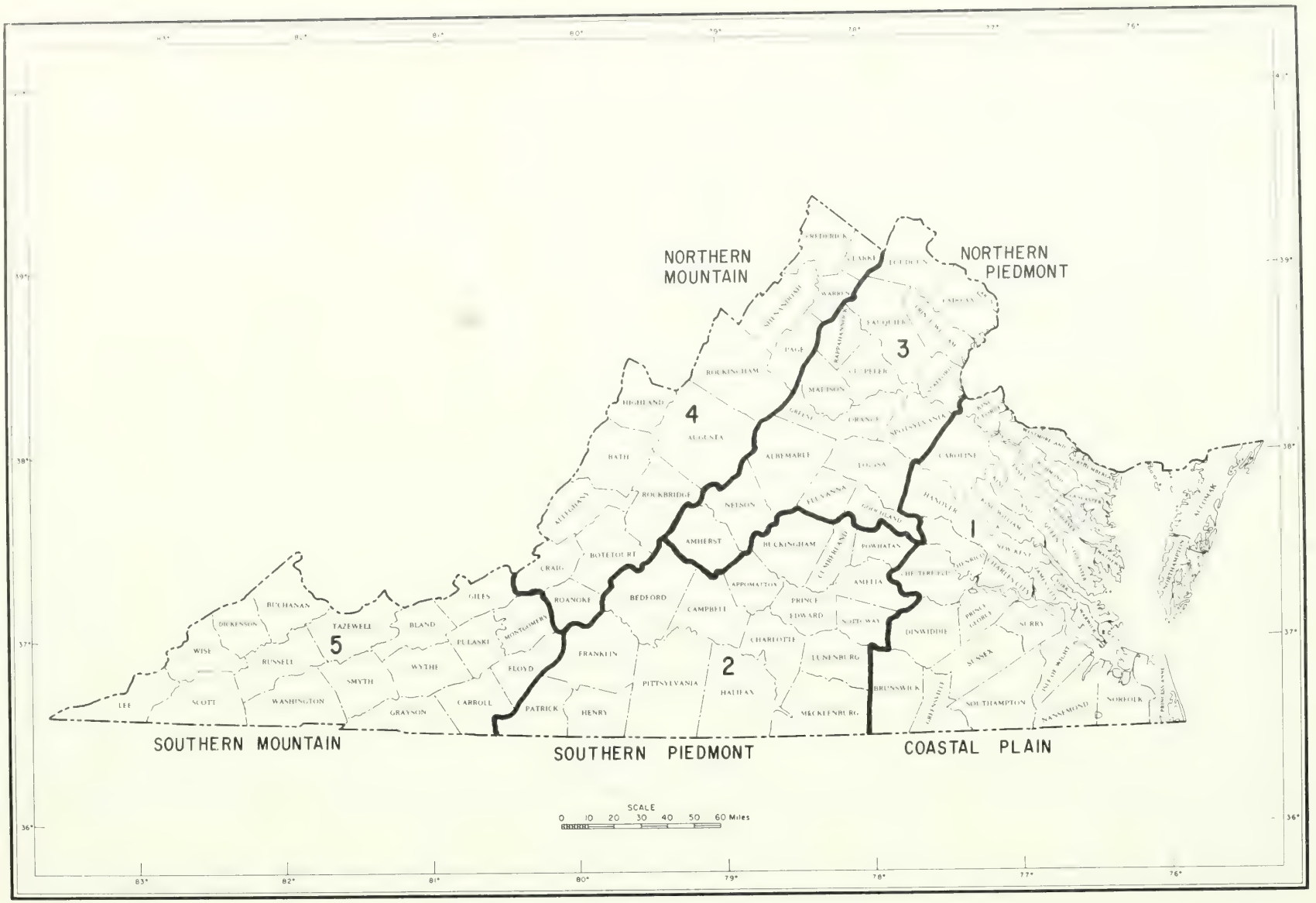


Figure 1. *Forest Survey Units in Virginia.*

Highlights

Since the second Forest Survey in Virginia was completed in 1957—

—area of commercial forest has increased from 15.4 to 15.8 million acres, a gain of 2 percent. New forest lands have hardly more than replaced the loss of almost ½ million acres of commercial forest to other land uses. Gains over losses were substantial only in the Southern Mountains, Forest Survey Unit 5 (fig. 1).

—ownership of about 3 million acres of commercial forest land has shifted from farmers to other nonindustrial private owners. These other owners include business and professional people, landholding companies, wage earners, and housewives, most of whom are engaged in occupations or enterprises not directly connected with timber growing. Other changes in forest ownership indicate that forest industries have increased their holdings from 1.2 to 1.6 million acres, and that public holdings have increased from 1.5 to almost 1.7 million acres.

—hardwoods have either replaced or partially replaced the softwoods on an estimated 0.7 million acres of commercial forest land. In addition to the natural succession toward hardwood cover types, many former pine and oak-pine stands now consist principally of low-quality hardwoods following logging.

—condition of the average stand has improved very little. The average stand contains about 100 more live trees 1.0 inch d.b.h and larger per acre, but most stands are still inadequately stocked with desirable trees. These are trees that have no serious defects in quality which limit present or prospective use. Across the State, rough and rotten trees which have limited or no merchantability potential occupy about 30 percent of the growing space.

—volume of hardwood growing stock has increased from 9.5 to 10.5 billion cubic feet, a gain of 10 percent. Average volume of hardwood growing stock per acre increased from 617 to 664 cubic feet. The oaks produced over one-half of the volume increase; however, light-seeded species, such as yellow-poplar and maple, made the greatest percentage gains.

—volume of softwood growing stock dropped from over 4.4 to less than 4.3 billion cubic feet, a loss of 3 percent. Volume of Virginia pine and white pine increased, but not enough to offset decreases in the volumes of loblolly and shortleaf pine. One significant aspect of this trend in softwood volume is that practically all the decrease has been in diameter classes 6 through 12 inches, which indicates an extremely heavy cut of small trees.

—volume of hardwood sawtimber has increased from 24.0 to almost 26.3 billion board feet, an increase of 9 percent. The increase was about equally distributed across all diameter classes. This increase in hardwood sawtimber has occurred in spite of a general upward trend in hardwood lumber production over the remeasurement period.

—there has been little change in the volume of softwood sawtimber, which totals 11.8 billion board feet. An increase in the larger diameter classes offset a decrease in small sawtimber. There was a downward trend in softwood

lumber production over the remeasurement period.

This latest Forest Survey in Virginia also shows that—

—there is a poor balance between annual timber growth and cut. The annual cut of softwood growing stock now exceeds net growth by 15 percent. Until this imbalance is corrected, further decreases can be expected in both the softwood inventory and growth. In contrast to the softwood situation, net annual growth of hardwood growing stock exceeds the cut by almost 38 percent.

—net growth averages only about one-half the potential yield which could be obtained if present stands were adequately stocked with desirable trees. There are numerous opportunities, through better timber management, to reduce the gap between present and potential growth. Neither the timber owners nor the timber users should be encouraged to believe that the present level of productivity will satisfy future timber needs. All indications are that it will not.

—cut from growing stock in 1965 totaled 466.1 million cubic feet, 13 percent above the cut at time of last survey. In contrast to the past, annual cut of hardwood is now greater than the annual cut of softwood. Output of timber products from softwood, however, still exceeds the output from hardwood because of differences in logging waste.

—annual pulpwood production has increased from 1.4 million cords in 1958 to 2.4 million cords in 1965, a 67-percent increase. Four of the State's 7 pulpmills have increased their pulping capacities substantially since 1958. Although the number of active sawmills declined from about 1,200 to 870 over the same period, annual lumber production has remained around 1.1 billion board feet. In addition, the new southern pine plywood industry has moved into the State with one large plant already in operation in the Coastal Plain.

Timber Trends

LITTLE NET CHANGE IN FOREST AREA

Total area of forest land in Virginia has increased from 16.1 to 16.3 million acres since 1957. Today, 15.8 million acres are classed as commercial forest, compared to about 15.4 million acres in 1957; the other half million acres of forest land are noncommercial because of ownership or adverse site conditions.

The apparent increase of almost 360,000 acres in commercial forest land must be evaluated carefully, however, to obtain a clear picture of the trend in forest area. For a true change, this increase must be discounted by 190,000 acres which were classified as noncommercial during the second survey because they were considered economically inaccessible. With present road systems and equipment, no forest land is now considered noncommercial because of inaccessibility. Therefore, these lands are now classified as commercial but represent no real gain. It is also well to examine the diversions of forest land to other uses along with the addition of new forest lands (table I).

Since 1957, almost 650,000 acres of nonforest land have been planted or naturally restocked with trees. During the same period, however, 480,000 acres of commercial forest land have been reserved or cleared for other land uses. Land clearing for improved pasture or other agricultural use was substantial throughout the Piedmont. Urban expansion into previously forested areas was most evident in the Northern Piedmont. In the Southern Mountains, 210,000 acres of new forest were added through the reversion of idle and abandoned land to forest, compared to a loss of only 18,000 acres of forest land to other uses.

Table I.—*Changes in area of commercial forest land, by survey unit, Virginia, 1957-1966*

Survey Unit	Area of commercial forest land in—		Net change	Changes							
				Total gain	Additions from—		Total loss	Diversions to—			
	1966	1957			Nonforest	Noncommercial forest		Noncommercial forest	Agriculture	Urban and other	Water
	Thousand acres										
Coastal Plain	4,090.7	4,067.1	+ 23.6	96.6	67.8	28.8	73.0	—	20.8	48.7	3.5
Southern Piedmont	3,775.5	3,747.3	+ 28.2	191.0	191.0	—	162.8	3.8	112.0	23.5	23.5
Northern Piedmont	2,448.9	2,492.5	— 43.6	129.1	116.0	13.1	172.7	23.4	81.0	64.6	3.7
Northern Mountain	2,503.4	2,398.0	+105.4	158.4	64.3	94.1	53.0	24.7	14.8	13.5	—
Southern Mountain	2,990.8	2,745.0	+245.8	264.1	209.9	54.2	18.3	4.4	4.0	8.6	1.3
State	15,809.3	15,449.9	+359.4	839.2	649.0	190.2	479.8	56.3	232.6	158.9	32.0

Currently, over 64 percent of the total land area in Virginia is forested. By survey unit, the portion forested ranges from a low of 59 percent in the Northern Piedmont to a high of 68 percent in the Southern Piedmont.

OWNERSHIP PATTERNS CHANGE

Individuals and private companies continue to hold almost 90 percent of the commercial forest land in Virginia, but there have been major ownership changes within these private holdings. Perhaps the most significant of these changes has been the shift of about 3 million acres of timberland from farm owner-

ship to a variety of other nonindustrial private owners. This trend was found throughout the State, but was most evident in the Coastal Plain and Southern Piedmont.

Because conditions of forest lands, the amount and kind of forest management applied, prospective timber growth, and availability all depend to a great extent upon the decisions of the owners and managers of the forests, such large-scale changes in the ownership pattern are of major interest. Currently, the average condition of stands owned by the miscellaneous private group does not differ significantly from the average condition of stands owned by farmers. As might be expected, both are generally found in poorer condition than stands owned by forest industry or public agencies. One likely result of the present trends in forest ownership is that future forestry programs will be subjected to a wider range of interests and attitudes.

Other changes in forest ownership since 1957 include an increase of over 320,000 acres in forest industry holdings, which are now extensive in all parts of the State except the Northern Mountains. Most of the 145,000-acre increase in public holdings occurred in the two Mountain Survey Units.

HARDWOODS OCCUPY MORE AREA

Hardwoods have occupied an increasing share of the growing space in Virginia since the first Forest Survey in 1940. Oak-hickory is now the predominant forest cover type on 9.8 million acres across the State. Oak-pine is the second leading forest type and now occupies over 2.5 million acres. In this type, southern pine makes up at least 25 but less than 50 percent of the live-tree stocking.[1]

Because of the heavier demand that has generally been placed upon pine stands and the pine component in mixed stands, hardwoods have been left to take over many areas following logging. Where there has not been an adequate pine seed source, hardwoods have also occupied a large share of the idle and abandoned farmland as it reverted back to forest. Natural hardwood encroachment remains a problem throughout most of the State, because some of the most prolific hardwoods are not desirable species in today's market.

Loblolly pine and Virginia pine are the leading softwood forest types and occupy 1.1 and 1.2 million acres, respectively. Virginia's expanding tree planting program, first started in 1917, has distributed more loblolly pine seedlings than all other species combined, but still the loblolly pine forest type has suffered a substantial loss in acres. It seems almost inevitable that hardwoods will take over more and more of the natural forests unless pine management is greatly intensified or cutting practices drastically changed in pine forest types.

AVERAGE STAND STILL IN POOR CONDITION

In general, Virginia's forests are still in poor condition and are producing far below their potential. Only about 3 out of every 5 acres of commercial forest land are 70 percent or better stocked with trees that qualify as growing stock. Most stands are fairly well stocked with live trees, but the problem is that 30 percent of the growing space is occupied by rough or rotten trees that currently have limited or no merchantability potential.

Planting, natural regeneration, and an outstanding fire control record have contributed to a 21-percent increase in the number of 2- and 4-inch trees since 1957. The average stand now has 632 sapling-size trees per acre. Only about one-half of these small trees qualify as growing stock that can be expected to contribute to the development of better stocked and more productive stands of timber.

Since 1957, average basal area per acre of all live trees 5.0 inches d.b.h. and larger has increased from 57 to 59 square feet. Average volume of all timber has increased from 1,110 to 1,156 cubic feet per acre. Net annual growth per acre averages only 43 cubic feet, which is about one-half the growth potential if all of the present stands were fully stocked with desirable trees.

MORE TIMBER VOLUME BUT LESS SOFTWOOD

Since 1940, volume of growing stock has increased 25 percent with hardwoods accounting for practically all of the increase (fig. 2). This favorable trend in volume is somewhat depressed in the Coastal Plain and Southern Piedmont where volume of softwood growing stock has declined 7 percent since 1957. In these areas, two of Virginia's most important species, loblolly and shortleaf pine, seemed to have been overcut, particularly in diameter classes 6 through 12 inches.

[1] A map detailing the major forest types in the South is available, upon request, from the Southeastern Forest Experiment Station.

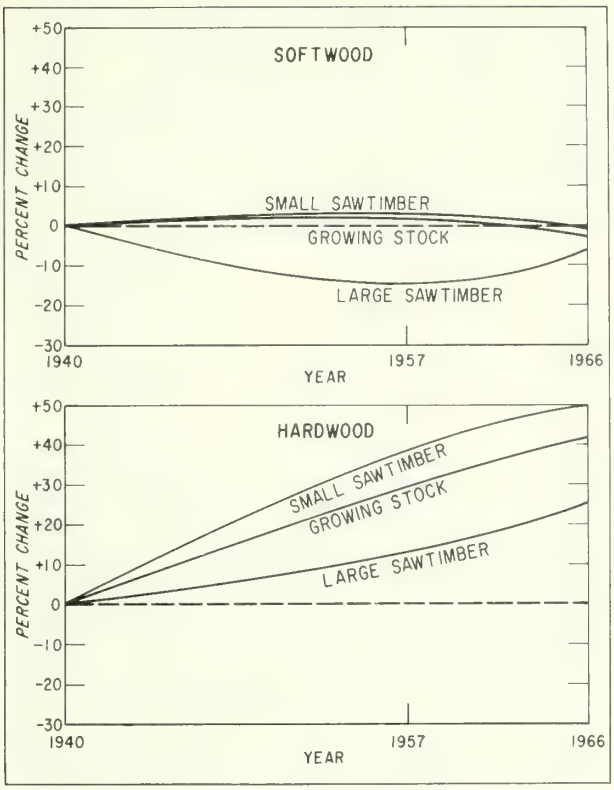


Figure 2. *Percent change in timber volume in Virginia since 1940.*

Since 1940, the board-foot volume of sawtimber has increased about 20 percent and is up 6 percent from 1957. Here again, hardwoods have provided most of the increase, but the larger softwood trees have fared better than poletimber and small sawtimber trees. To provide a basis for comparisons, adjustments have been made to allow for differences in volume tables and sawtimber merchantability specifications used in previous surveys.

Species composition, average volume per acre, and changes in volume vary across the State. Highest volumes are found in the Coastal Plain where sawtimber averages 3,372 board feet per acre, very close to the average in 1957. There, softwoods comprise about one-half the sawtimber volume, and loblolly pine, with 5.9 billion board feet, is by far the predominating species. Volume in oak, hickory, and beech totals 3.4 billion board feet. Sweetgum, blackgum, tupelo, yellow-poplar, soft maple, and ash, with 3.2 billion board feet, account for almost 46 percent of the hardwood sawtimber.

Lowest sawtimber volumes are found in the Southern Piedmont where the average is 1,890 board feet per acre, compared to 1,845 board feet in 1957. About 35 percent of the stands in the area are sapling and seedling stands—the highest proportion in the State. Shortleaf pine, with 1.1 billion board feet, is the leading softwood species. Oak, hickory, and yellow-poplar, with almost 4.0 billion board feet, account for 79 percent of the hardwood sawtimber.

In the Northern Piedmont, average volume per acre has increased from 1,987 to 2,246 board feet. Virginia pine is the most common softwood species in the area; however, the volume of all softwood sawtimber totals less than 1.0 billion board feet. As for the hardwoods, species composition differs little from that found in the Southern Piedmont. Volume in oak, hickory, and yellow-poplar is 3.9 billion board feet, almost 86 percent of the hardwood total.

The greatest increase in sawtimber volume since 1957 has occurred in the Northern Mountains where average volume per acre has increased from 1,992 to 2,287 board feet. Volume of softwood sawtimber totals over 1.0 billion board feet with pitch pine the leading softwood species. White pine is also an important species in the area. Volume of hardwood sawtimber totals 4.5 billion board feet, with chestnut oak alone accounting for almost 1.2 billion board feet.

In the rugged Southern Mountains, volume of sawtimber averages 2,048 board feet per acre compared to 1,942 board feet in 1957. Here, hardwoods dominate the forests to a greater extent than in any other part of the State (fig. 3). Besides oak, hickory, and yellow-poplar, a substantial quantity of beech, sugar maple, red maple, and basswood sawtimber is present. Hardwood sawtimber totals almost 5.4 billion board feet in the area. Although hardwoods far outnumber the softwoods, volume of softwood sawtimber has increased 13 percent since 1957 and now totals 0.7 billion board feet. White pine, hemlock, and pitch pine are the leading species.

IMBALANCE BETWEEN GROWTH AND CUT

The relationship of annual growth to annual cut is the most fundamental piece of knowledge that can be used to predict trends in the timber supply. When all species are grouped in Virginia, net growth of growing stock exceeds cut by 16 percent; however, a crucial imbalance between the growth and cut of softwood has now taken shape. The latest

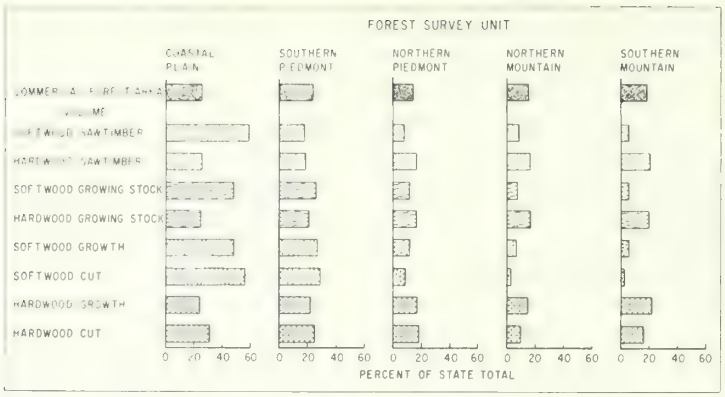


Figure 3. *Relative importance of forest resource by Survey Unit, Virginia, 1966.*

findings indicate that cut from softwood in 1965 exceeded growth by 15 percent (fig. 4).

These latest findings should come as no real surprise, but they do deserve further discussion. For many years the share of total timber cut in Virginia that has come from softwood growing stock has exceeded the proportion of softwood in the total inventory. The 1957 survey indicated that the margin between softwood growth and cut had become extremely narrow and that any increase in the cut of softwood could result in some depletion in the inventory. Although the recent findings do not show any increase in softwood cut, the inventory has begun to decrease slightly.

Between 1957 and 1966 the growth rate (growth as a percent of inventory) itself apparently declined. This decline could possibly have resulted from increased stand densities with improper spacing, climatic factors, and the fact that current methods of measuring growth are more accurate than those previously used. For example, in 1957 growth estimates were based entirely upon increment cores extracted from sample trees. In the latest survey, however, growth estimates are based upon diameter remeasurements of these same sample trees that were still present.

Because of the decline in rate of growth from 4.3 to 3.7 percent, volume growth has changed little when all species are grouped, in spite of the increase in total volume of growing stock. In 1965, net growth totaled 541 million cubic feet, compared to 549 million cubic feet in 1956. Even with the decrease in growth rate, hardwood growth has just about offset the loss in softwood growth because of the larger hardwood inventory.

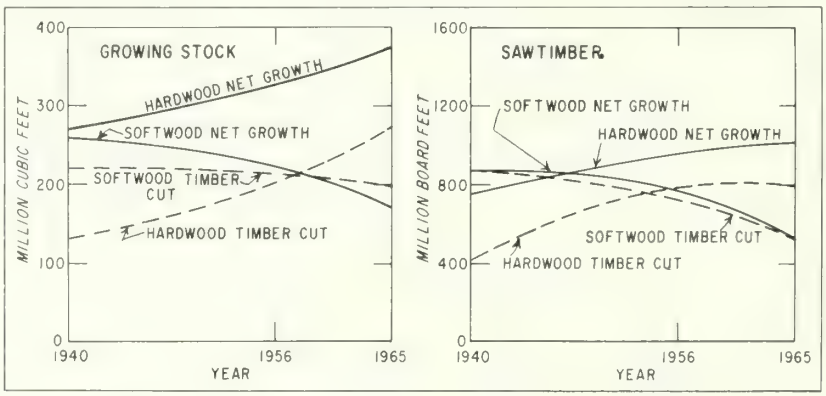


Figure 4. *Trend in net growth and timber cut in Virginia since 1940.*

Total annual cut of growing stock has increased from 412 million cubic feet in 1956 to 466 million cubic feet in 1965. All of the increase in cut has come from hardwood, which can support a heavier cut. For the first time, total cut from hardwood growing stock exceeds the total cut from softwood.

All of these trends and the supporting statistics seem to lead to one conclusion: the softwood timber supply in Virginia is in danger of further depletion unless even more of the total cut can be shifted to hardwood until timber managers can improve the softwood situation.

Timber Products Output

In 1965, timber products from Virginia's forests totaled 443 million cubic feet, compared to 456 million cubic feet in 1956. Pulpwood, including output from plant byproducts, increased from 113 to 173 million cubic feet, but this increase was offset by decreases in saw logs, veneer logs, fuelwood, and other miscellaneous products.

Although the output of timber products is down slightly, total timber cut from growing stock in 1965 was 13 percent greater than in 1956. The reason for this apparent inconsistency is that volume in logging residues more than doubled. These logging residues include woods waste on logging operations as well as timber removed in land clearing and cultural operations that was not used for any product. A greater share of the cut now comes from hardwoods where woods waste tends to run considerably higher than for softwoods. In 1965, volume of growing stock which was cut, girdled, poisoned, or destroyed and not used for any product totaled 108 million cubic feet. About 89 percent of this total was hardwood.

SAW LOGS ARE STILL THE LEADING PRODUCT

Although the number of active sawmills in Virginia declined from about 1,200 to 870 between 1958 and 1965, saw logs are still the leading timber product removed from the forests in terms of volume when all species are included. In 1965, output of saw logs totaled 182 million cubic feet. Hardwoods provided almost 55 percent of this total output.

Lumber production has fluctuated from year to year, but has averaged around 1.1 billion board feet annually since 1957 (fig. 5). Production of hardwood lumber exceeded the production of softwood lumber for the first time in 1963. As this report was being written, a temporary decline in new housing construc-

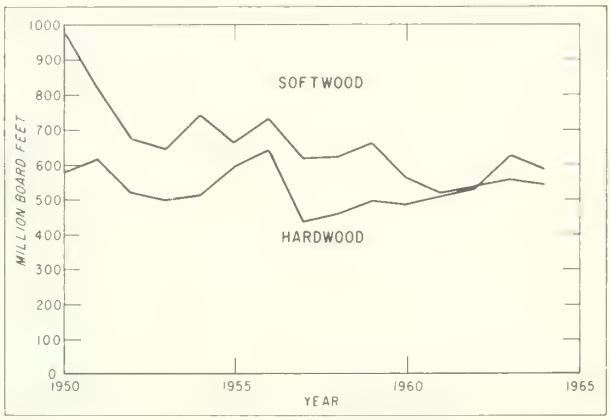


Figure 5. *Lumber production in Virginia, 1950 to 1965. Source: Bureau of the Census (Data for 1965 are not available)*

tion was causing some cutbacks in lumber production. These temporary cutbacks, however, should have little effect on the long-term trends in lumber production.

PULPWOOD PRODUCTION AT AN ALL-TIME HIGH

Since 1958, four of Virginia's seven pulpmills have increased their pulping capacities substantially. In 1965, output of pulpwood reached 173 million cubic feet, or 2.4 million cords, an all-time high (fig. 6). Pines provided about two-thirds of this total output. It might come as a surprise, but it is estimated that more pine timber in Virginia is now cut for pulpwood than for saw logs.

Some very impressive statistics are available to describe the increase in pulpwood production over the past 15 years. In 1950, production in Virginia totaled 1,044,000 cords, comprised of 775,000 cords of pine, 250,000 cords of hardwood, and 19,000 cords of dead chestnut. Chestnut as a source for pulpwood gradually faded out of the picture, but an entirely new source of wood was tapped a few years later—plant byproducts from sawmills and veneer mills. The introduction of debarkers and chippers at sawmills served as the master key to this new wood supply. By 1960, annual pulpwood production had risen to 1,833,000 cords, comprised of 1,278,000 cords of pine, 437,000 cords of hardwood, and the equivalent of 118,000 cords from these byproducts. Pulpwood from all of these sources continued to increase. In 1965, the latest year for which statistics are available, production reached 2,421,000 cords, comprised of 1,424,000 cords of pine, 670,000 cords of hardwood, and the equivalent of 327,000 cords from byproducts.

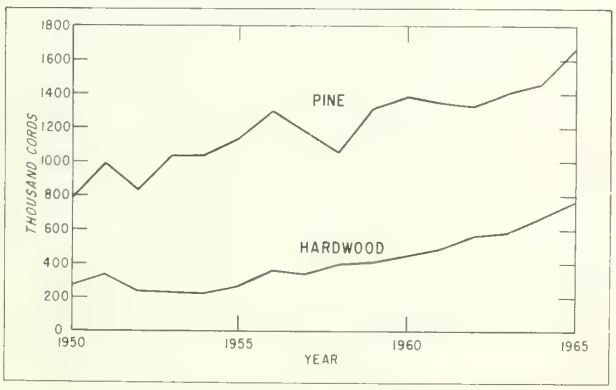


Figure 6. *Pulpwood production in Virginia, including byproducts, 1950 to 1965.*

OUTPUT OF VENEER LOGS IS DOWN

In 1965, there were 22 active hardwood veneer and plywood plants in Virginia, and the first southern pine plywood plant in the State was completed. Output of veneer logs totaled less than 8 million cubic feet, compared to 10 million cubic feet in 1956. Most of the veneer logs were hardwood because the new pine plywood plant was not completed until near the end of the year. Based on the announced capacity of this new plant, its annual timber requirements could approach 40 million board feet, or over 7 million cubic feet.

MISCELLANEOUS PRODUCTS

In addition to the sawmills, pulpmills, veneer, and plywood plants, there are approximately 45 other primary wood-using plants in Virginia. These plants produce miscellaneous products that range from poles, piling, posts, and mine timbers to cooperage, handle stock, particle board, pallets, and excelsior. In 1965, output of all these miscellaneous products totaled about 19 million cubic feet. The source for these products was divided about equally between softwood and hardwood.

PLANT RESIDUES

The primary wood-using industries in Virginia produced an estimated 94 million cubic feet of wood residues in 1965. Slightly less than one-half of these residues were either used in the manufacture of fiber products, specialty items, or for fuel and litter. It is estimated that about 50 million cubic feet were not used for any purpose. Of the amount not used, about 35 million cubic feet were fine residues, such as sawdust and shavings, which have very limited use at this time.

INDUSTRY CONCENTRATED IN COASTAL PLAIN AND SOUTHERN PIEDMONT

A large share of the forest industry in Virginia is concentrated in the Coastal Plain and Southern Piedmont (fig. 7). The physiographic features and pine timber resources, among other factors, have attracted a variety of wood-using industries into these areas. Fewer plants and timber markets are found in the mountains where hardwoods prevail, probably because of the poor transportation facilities and less available labor.

FUELWOOD CONSUMPTION CONTINUES TO DECLINE

Volume of fuelwood used in Virginia in 1965 was estimated to total about 61 million cubic feet, compared to 86 million cubic feet in 1956 and over 200 million cubic feet in 1940. About three-fourths of the 1965 estimate was roundwood and the other one-fourth came from plant byproducts. Although the use of wood for fuel continues to decrease, fuelwood still ranks third among all timber products in terms of volume.

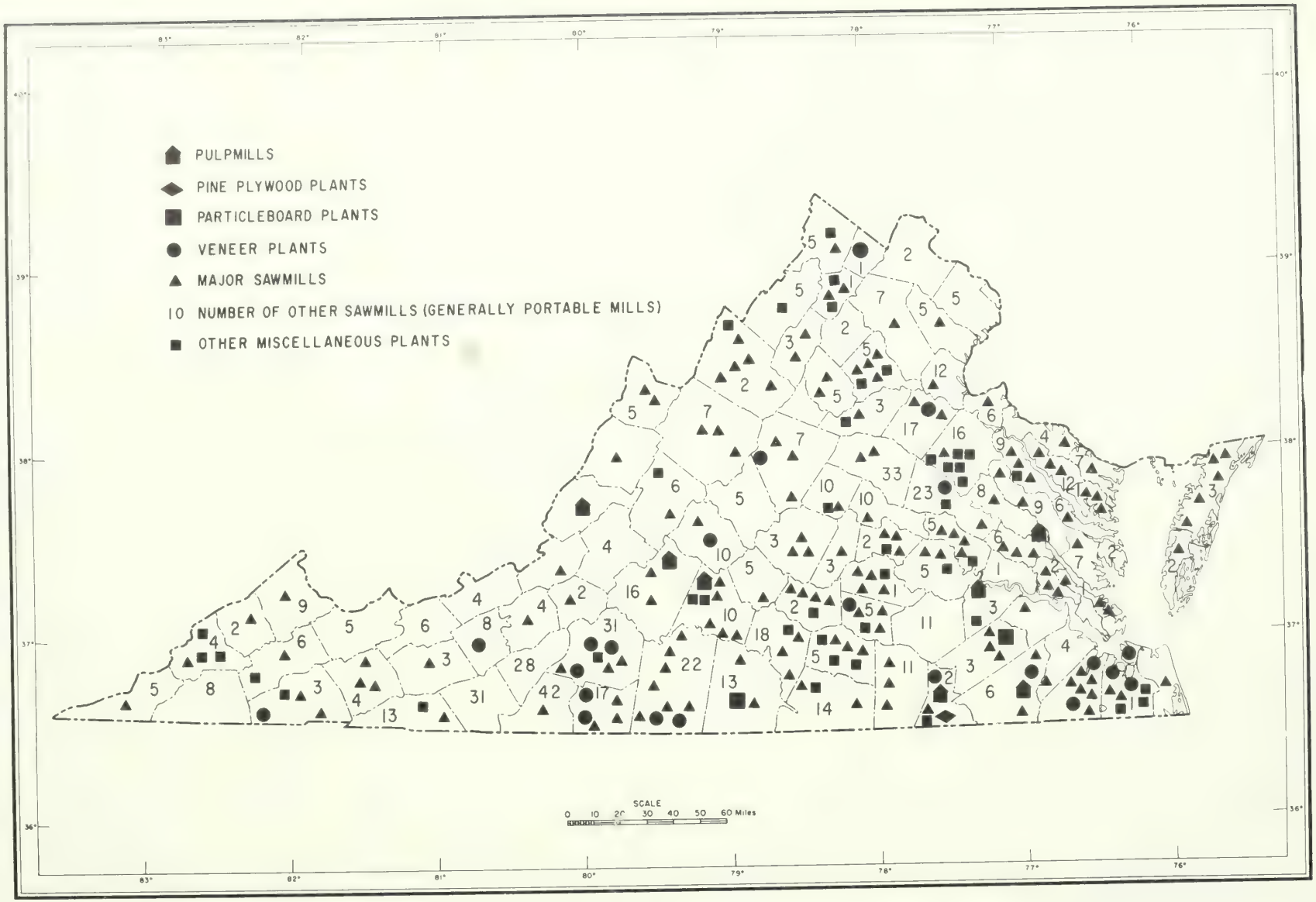


Figure 7. *Location of primary wood-using industries in Virginia, 1966.*

Timber Supply Outlook

Any long-term projection of timber supply is subject to many uncertainties, and the results largely reflect the assumptions that must be made about future forest area, levels of protection, and other management activities. Nevertheless, by introducing some reasonable assumptions, it is possible to estimate the prospective volume of timber that will be available if the current trend in forest management continues. This estimate can also be compared to the potential volume of timber that would be available annually if the present inventory were improved so that near maximum timber production could be obtained from Virginia's forest land. The results of projections made for Virginia and the assumptions used are described in this section. No attempt is made to project the timber supply beyond 50 years or to project timber demand. In this report, the projected trends are illustrated to the year 2000.

PROSPECTIVE AVAILABLE CUT

This first projection was made to obtain estimates of the volume of timber that will be available to forest industries annually, based on assumptions that the difference in cut and growth will gradually diminish until growth equals cut in 50 years, and that the current trend in forest management will continue. This assumes that forest protection, planting, stand improvement, thinning, stand conversion, and improved utilization will counteract any tendency for mortality to increase and radial growth to decrease in response to higher stand densities.

Because of the present deficit of softwood growth as related to cut, no realistic projection of present trends and conditions can be expected to show an increase in available softwood cut in the immediate future. The projection used here indicates that by the year 2000, available cut from softwood growing stock and sawtimber will likely decrease by 7 and 1 percent, respectively (fig. 8). This means that the present cut from softwood growing stock might have to be reduced from 197 to 182 million cubic feet per year, or slightly lower, to bring cut into balance with anticipated growth.

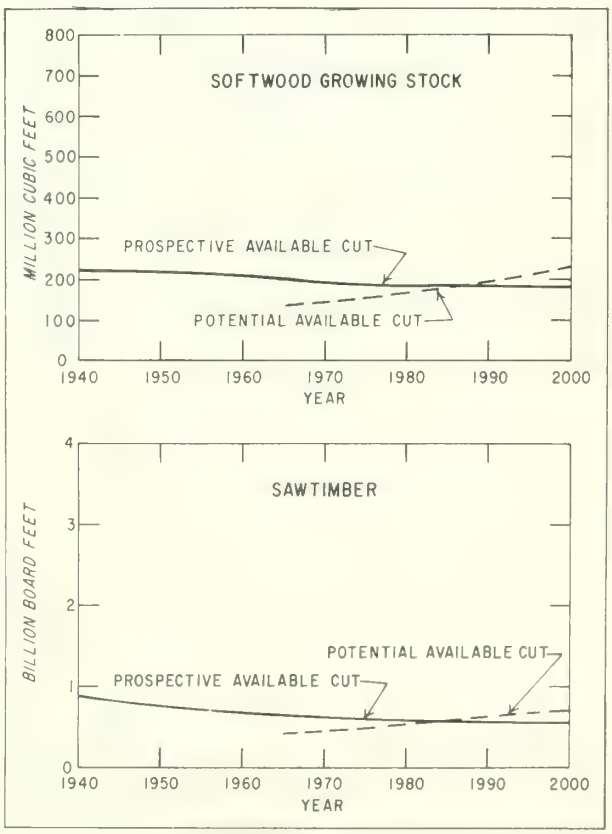


Figure 8. *Prospective and potential available cut, softwood, 1965-2000, Virginia.*

The increase in acres of forest planting in recent years provides the most encouraging prospect for improvement in the softwood situation (table II). Most of these acres have been planted with pines, and the successful plantations should start contributing substantially to the softwood timber supply within the next 20 years. In the meantime, further depletion of the softwood inventory seems almost inevitable.

The hardwood projection shows an entirely different picture from that described for softwood. Indications are that available cut from hardwood growing stock will likely more than double by the year 2000, and that available cut from hardwood sawtimber can be expected to increase by 56 percent (fig. 9). This means that the annual cut of hardwood growing stock could conceivably be increased from 269 to nearly 600 million cubic feet if present trends continue.

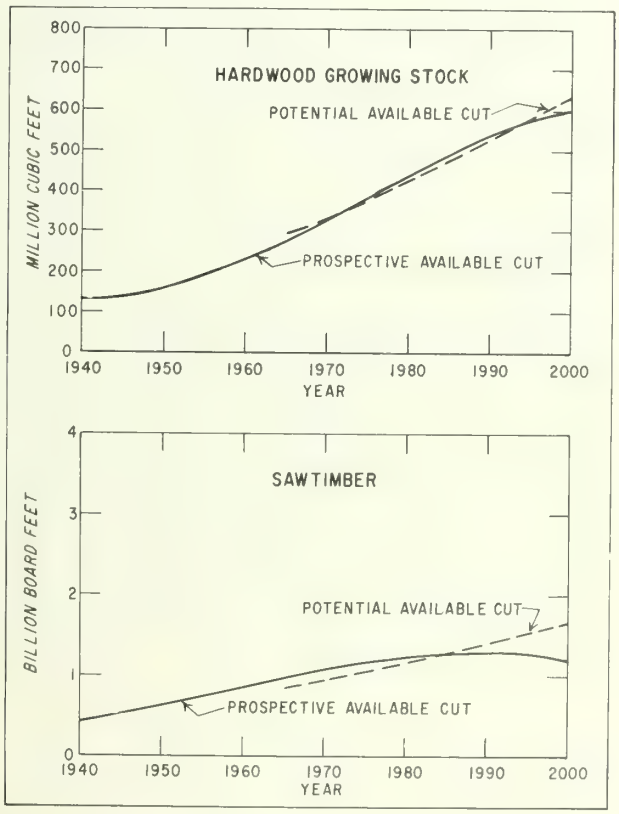


Figure 9. *Prospective and potential available cut, hardwood, 1965-2000, Virginia.*

The encouraging outlook for hardwood is largely attributed to the highly successful fire protection program in Virginia over the past several years. Between 1955 and 1965, the area burned annually by wildfire has averaged only 13,000 acres (table III). The result has been the establishment of abundant hardwood reproduction across the State. It is generally recognized that entirely too much of this reproduction is comprised of undesirable species which cannot be developed into stands of high quality timber that will satisfy the needs of the more demanding hardwood industries. Because of advancement in hardwood utilization, however, the timber supply outlook for industries dependent primarily upon wood fiber, without regard to quality, looks reasonably bright.

Table II.—*Acres of forest planting,*[1] *by ownership class, Virginia, 1956-1966*

Fiscal year	Ownership class				All ownerships	Accumulative total
	National Forest	Other public	Forest industry	Other private		
	Acres					
1956	183	535	9,769	9,866	20,353	20,353
1957	405	432	15,573	15,862	32,272	52,625
1958	131	1,116	18,601	19,527	39,375	92,000
1959	218	900	17,371	20,258	38,747	130,747
1960	332	602	10,804	23,448	35,186	165,933
1961	459	2,809	15,581	23,256	42,105	208,038
1962	538	1,520	24,195	19,870	46,123	254,161
1963	530	1,432	27,671	18,193	47,826	301,987
1964	1,270	1,729	39,023	22,570	64,592	366,579
1965	1,424	1,312	42,377	28,689	73,802	440,381
1966	2,418	1,707	35,039	25,603	64,767	505,148

[1] Includes acres of planting by direct seeding. Source: U. S. Department of Agriculture, Forest Service, *Tree Planters' Notes*, 1956-1966.

Table III.—*Forest area under fire protection, protected area burned, number of fires, and average size of fires, Virginia, 1955-1965*

Year	Forest area protected		Protected area burned		Fires	Average size of fires
	Thousand acres	*Percent* [1]	*Thousand acres*	*Percent*	*Number*	*Acres*
1955	14,650	100	18	0.12	1,564	11
1956	14,665	100	10	0.07	1,461	7
1957	15,728	100	4	0.03	1,077	4
1958	15,729	100	5	0.03	1,198	4
1959	15,731	100	16	0.10	2,466	7
1960	15,738	100	7	0.05	1,559	5
1961	15,736	100	4	0.03	1,193	4
1962	15,742	100	9	0.06	1,678	5
1963	15,746	100	49	0.31	3,427	14
1964	15,752	100	8	0.05	1,725	4
1965	15,702	100	16	0.10	2,496	7

[1] Percent of commercial forest area.

This discussion has pointed out that a major hardwood problem is inferior quality rather than quantity, but it would be negligent not to emphasize the tremendous opportunities with hardwood under good forest management. In both softwood and hardwood there may be areas where deficiencies will occur in select species, tree sizes, and quality timber.

POTENTIAL AVAILABLE CUT

A second projection was made to obtain estimates of the volume of timber that could be available to forest industries annually, based on the increase in production that could result from intensified forest management. The assumptions for this projection call for an acceleration of management over the next 50 years to develop the inventory needed to sustain a level of productivity that would more nearly reflect the capacity of Virginia's forest land.

Results from this projection show a potential available cut from softwood growing stock of about 270 million cubic feet at the end of 50 years. Potential available cut from softwood sawtimber over the same period could approach 0.9 billion board feet. A comparison between this potential and the prospective available cut from softwood provides a crude measure of the opportunities that are available for improving the softwood situation. Any immediate reduction in softwood cut through better utilization or hardwood substitution that can be accomplished will certainly make a softwood recovery easier, but a stepped-up planting program is obviously necessary.

Potential available cut from hardwood growing stock could increase to over 800 million cubic feet at the end of 50 years. The potential available cut from hardwood sawtimber could approach 2 billion board feet annually. To reach this potential, however, would require a major timber stand improvement program to remove and replace existing poor quality hardwoods with more desirable and thrifty trees. Although better hardwood utilization has advanced, the practical implementation of a timber stand improvement program of the magnitude required challenges the entire timber-based industry as well as timber owners and managers.

BASIS FOR PROJECTIONS

In these projections for Virginia, one basic assumption is that land equivalent to the present area occupied with commercial forests will be available to grow timber. A large part of 660,000 acres of idle agricultural land might possibly be converted back to forest, but present trends indicate that diversions of forest land to other uses will likely counterbalance the addition of new forest land. Although indications are that additional agricultural lands will not be needed for several years, urban and other encroachments into forests are expected to continue.

A second basic assumption in both projections is that an area equivalent to that currently 30 percent or better stocked with softwood can be perpetuated with softwood cover types. To retain this balance between the two broad species groups, softwoods and hardwoods, would necessitate a greater control than has been exerted in the past over hardwood encroachment upon the upland sites that are better suited for growing pines.

In the first projection, the current growth, cutting, and mortality rates were applied with only one significant exception—cut and growth are gradually brought into balance over the next 50 years. The ingrowth rate into the 2-inch diameter class each year, important in long-term projections, was based on the net change in numbers of trees in this diameter class between the last two surveys. Because of the stepped-up planting program in recent years, an ingrowth rate for softwoods determined on this basis is probably conservative.

In the second projection, the development of timber inventories that would sustain the potential available cut assumes that, starting now, timber management efforts could be greatly accelerated over the next 50 years. To sustain the potential available cut of softwood described earlier in this chapter would require approximately 4.7 million acres of well-stocked softwood stands carrying an average basal area of 90 square feet per acre. Stand structures would also need to be developed which would provide a greater proportion of trees in the larger diameter classes, 15.0 inches d.b.h. and up.

To provide the potential available cut of hardwood would require about 11.1 million acres of well-stocked hardwood stands carrying an average basal area of 120 square feet per acre. Assumptions here are that stand conditions could be corrected to prevent further proliferation of noncommercial and other undesirable trees. One encouraging fact is that evidence is already available that points toward greater interest in better hardwood management, which has long taken second place to pine management.

TIMBER QUALITY

Before leaving the subject of timber supply outlook, the existing and prospective deficiencies in timber quality, especially in hardwood, deserve closer examination. Currently, the volume of hardwood timber in Virginia totals almost 13.7 billion cubic feet. When this total is divided into the various size and quality classes, however, it becomes less impressive. First of all, 23 percent, or 3.2 billion cubic feet, is in rough and rotten trees which do not meet minimum standards for growing stock. Seventy-five percent of this 3.2 billion cubic feet is in trees that do not qualify as growing stock, primarily because of roughness and poor form. Another 19 percent is in trees that do not qualify as growing stock, primarily because of internal rot. Finally, about 6 percent is in trees of noncommercial species—blackjack oak, sourwood, sassafras, redbud, ailanthus, blue beech, etc. At best, most of this material can be used only for fiber products, fuelwood, or other local consumption.

Another 29 percent of the total volume is in trees less than 11.0 inches d.b.h., the minimum size considered for sawtimber. When another 7 percent is deducted to account for the volume in the upper-stem portions of sawtimber trees, only 41 percent of the original total remains. This means that the maximum volume of hardwood in the present inventory that can be manufactured into lumber, ties, timbers, and veneer totals less than 5.6 billion cubic feet, or about 26.3 billion board feet.

Because timber requirements differ for the various products, the volume of hardwood sawtimber can be further broken down on the basis of log grades (fig. 10). About 39 percent of the sawtimber volume is in grade 4 material suitable only for the manufacture of ties and timber. For these products, size and strength are the important characteristics

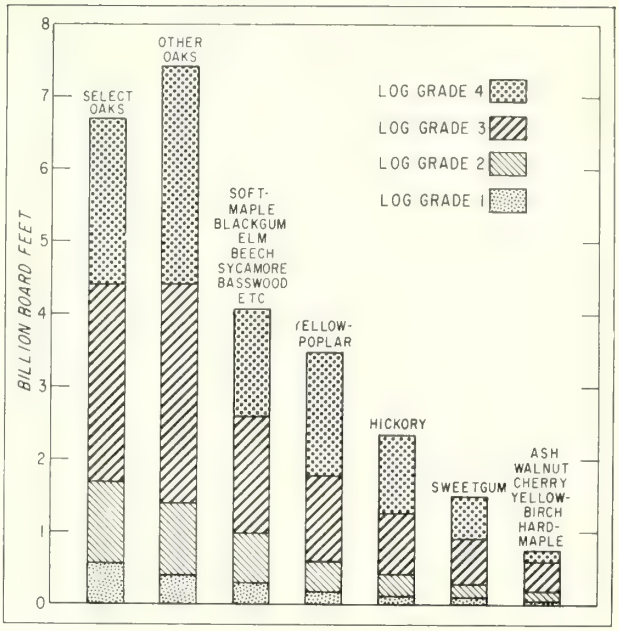


Figure 10. *Volume of hardwood sawtimber, by species groups and log grade, Virginia, 1966.*

rather than clear surfaces. Another 40 percent of the total volume is in grade 3 material suitable only for the poorer grades of lumber. This leaves less than 5.6 billion board feet, or 21 percent of the total volume of hardwood sawtimber, to provide the present needs for veneer, plywood, flooring, and top quality lumber.

Because so many of the hardwood stands have been high-graded in the past, to attain substantial improvement in timber quality will require intensive forest management in the years ahead. Quality is also a problem in the softwoods, but to a lesser extent than in hardwoods. The practical solution to the entire quality problem probably lies somewhere between making out with the kinds of timber available and taking whatever actions are needed to grow better quality timber.

Management Opportunities

GROWTH FAR BELOW POTENTIAL

In the earlier chapters of this report, the objectives have been to describe trends in the timber supply and timber products output and to provide a realistic estimate of the quantity of timber that will be available over the next 30 to 35 years. The objective in this chapter is to identify some of the opportunities available to timber managers for improving the timber supply in Virginia. Currently, net growth of growing stock across all site classes averages only about 34 cubic feet per acre, or about one-half the potential yield which could be obtained.

Over 11.0 million acres, or 70 percent, of the commercial forest land in Virginia are capable of producing 50 cubic feet or more wood per acre each year at culmination of mean annual growth when fully stocked with desirable trees. Over 2.1 million of these acres are capable of producing 85 cubic feet or more per acre. Unfortunately, relatively few stands are fully stocked with desirable trees; therefore, the gap remains wide between attained and potential growth.

As best determined from the survey, slightly over 2.5 million acres are adequately stocked with desirable trees free from competition and overtopping that would impede growth, or have conditions favorable for natural improvement of stocking without special treatment (Condition Classes 10 and 30). An additional 0.2 million acres are overstocked with desirable trees but would require only periodic thinning to increase prospective yields (Condition Class 20). In general, the present condition of the remaining stands offers opportunity for considerable improvement.

STAND IMPROVEMENT

About 8.9 million acres, 60 percent or better stocked with growing stock trees, generally have little prospect for improvement without special treatment, such as cull tree removal (Condition Classes 40, 50, and 60). In these stands, rough and rotten trees occupy up to one-third the growing space. The removal of the rough and rotten trees, and thinning to favor the better quality trees and more desirable species, could greatly improve both the quality and volume of timber expected from these stands in coming years. The amount and kind of treatment given these stands will particularly influence the hardwood timber supply over the next several decades. Treatment of the better stocked stands in these conditions, if approaching rotation age, would usually be postponed until harvest.

REGENERATION

On the 4.3 million acres that are less than 60 percent occupied with growing stock, present conditions generally offer little prospect for improvement short of site preparation and regeneration (Condition Class 70). Rough and rotten trees occupy almost one-half the growing space in these stands. Also included among these stands, however, are most of the nonstocked areas that can be planted without site preparation. Control over the stands during the critical regeneration period is especially important, however, to assure that the reproduction is desirable for the particular site or type of land involved.

PLANTING OPPORTUNITY

Plantations probably provide the most direct approach to fully stocked stands of desirable timber species. As was pointed out

earlier in this report, there are 660,000 acres of idle agricultural land in Virginia. Most of this land could be planted with seedlings with little or no site preparation. An additional 440,000 acres scattered within the commercial forests are nonstocked and can be added to the total land available for planting without site preparation.

If these 1.1 million acres of idle and nonstocked land are to contribute materially to timber supplies by the year 2000, reforestation should be completed by 1980. To accomplish this job will require planting about 85,000 acres annually, or some 20,000 more acres than have been planted during recent seasons.

Of course, a large share of these lands will eventually seed in through natural regeneration, but many of the stands produced will have less than optimum growth potential. A proliferation of poorly stocked stands in the past through natural regeneration is in fact contributing to the low growth yields experienced today.

BETTER PROTECTION

The reduction of timber losses caused by fire, insects, disease, and other natural destructive agents represents another opportunity to increase future timber supplies. In 1965, mortality of growing stock was down 11 percent from 1956, but still amounted to 78.7 million cubic feet, almost 17 percent of the volume of growing stock cut for all purposes.

In many instances, field crews were unable to determine the exact cause of death because of the 8- to 10-year remeasurement period involved. Trees which died during the earlier part of the remeasurement period left little evidence as to cause of death. A substantial amount, 5 million cubic feet, of the softwood loss is attributed to pine bark beetles, mostly in the Southern Piedmont and Coastal Plain. Individual tree suppression was one of the leading causes of death identified for both softwoods and hardwoods. In addition, many rot fungi plague the hardwoods throughout the State and, although they are not leading causes of death, have the greatest impact of all the diseases on net increment and the reduction in quality of individual trees.

Because of the excellent fire control record in Virginia, timber losses to wildfire have been small. All forest lands in the State are protected from fire, and the success of the program has certainly reduced the risk of widespread loss. Continued cooperation from the general public, particularly during prolonged periods of drought, is essential to protect and encourage the efforts required for intensive timber management.

MORE COMPLETE UTILIZATION

In 1965, logging and plant residues combined totaled over 150 million cubic feet. Although full economic use of the entire volume of woods and plant residues is not presently feasible, further advances in timber utilization can be expected. One pulpmill in Virginia is already successfully producing a small share of its pulp from pine sawdust that is blended with long fiber pulp. Many progressive firms in Virginia are today selling all of their wood residues, including bark, and have closed down their residue burners. There is promise that other plants will follow suit and thus help to reduce the strain on standing timber by more complete utilization. Greater use of the 2.9 billion cubic feet in rough trees could also stretch existing timber supplies and at the same time facilitate corrective management practices.

GENERAL OUTLOOK

In the past, the wealth of Virginia's forests has been considered to be mainly in its pine timber, and the State's forest industry has been developed to capitalize on this wealth. The pines have served Virginia well, but are now in danger of being slowly and continuously depleted in volume, growth, and area unless positive steps are taken to alter present trends. The positive steps must include extensive planting of abandoned lands suitable for pine, as well as cultural measures to maintain pine stands on sites where pine is more suitable. Otherwise, low-value hardwoods will displace the pines on these sites, particularly if nature is allowed to follow the normal ecological pattern of establishing a hardwood climax forest type.

During the past decade, the forest economy in Virginia has shifted to some extent from a pine dominated to a hardwood oriented economy. For the first time in its history, more hardwood is being cut than softwood. Because of the greater logging waste generally associated with the harvesting of hardwood, however, output of timber products from softwood still exceeds the output from hardwood.

All of the trends from softwood to hardwood are not necessarily bad. Virginia has the land capable of producing fine hardwoods

and it has the industry capable of using them. Good hardwoods bring prices equal to and often much greater than pine. Regeneration of hardwoods is more positive and less expensive than pine, but management and development of quality in hardwoods is more difficult and not so well understood as pine management.

The large volume of hardwood growing stock and its margin of growth over cut offer the opportunity for plant expansion and new industries, and efforts can well be directed along these lines. The immediate effort, however, should be directed to increasing the use of rough hardwood trees for fiber products, thus providing growing space for better quality trees. Markets for hardwoods are ever broadening, and Virginia can capitalize on its natural wealth of hardwoods if it rises to the challenge of developing an aggressive hardwood forestry program.

Appendix

ACCURACY OF THE SURVEY

Sample points systematically spaced on aerial photographs were classified to provide preliminary estimates of forest area by county. Field crews then examined 7,217 of these points on the ground to adjust for misclassification and changes in land use since the date of aerial photography. Estimates of timber volume and growth are based on measurements recorded at 4,669 of the ground check points classed as forest land.

Statistical analysis of the data indicates a sampling error of ±0.4 percent for the estimate of total forest area, 1.2 percent for total cubic volume, and 1.8 percent for total cubic-volume growth. As these totals are broken down by forest type, species, tree diameter, and other subdivisions the possibility of error increases. The order of this increase is suggested in the following tabulation which shows the sampling error the estimates are liable to, two chances out of three.

Forest area	Sampling error [1]	Cubic volume	Sampling error [1]	Net cu. ft. growth	Sampling error [1]
Thousand acres	*Percent*	*Million cu. ft.*	*Percent*	*Million cu. ft.*	*Percent*
16,339.0	0.4				
2,746.6	1.0	14,785.2	1.2	541.1	1.8
686.6	2.0	4,973.7	2.0	483.3	2.0
305.2	3.0	2,210.6	3.0	194.8	3.0
171.7	4.0	1,243.4	4.0	109.6	4.0
109.9	5.0	795.8	5.0	70.1	5.0
27.5	10.0	198.9	10.0	17.5	10.0
12.2	15.0	88.4	15.0	7.8	15.0
6.9	20.0	49.7	20.0	4.4	20.0
4.4	25.0	31.8	25.0	2.8	25.0

[1] By random-sampling formula.

HOW THE FOREST INVENTORY IS MADE

The basic data presented in this report were obtained by a sampling procedure designed for use, with some regional variation, by Forest Survey units throughout the Nation. The method of survey is intended to provide reliable statistics primarily at the State level, and to assure that these statistics have a certain degree of comparability with similar data collected across the Nation. The basic steps of the procedure used in Virginia were as follows:

1. Initial acreage estimates of forest land and other land-use classes were obtained by classifying grid points printed on the latest aerial photographs available for each county.

2. Each land-use class, excluding reserved forest land, was subsequently sampled proportionally on the ground. In the ground check, maximum use was made of permanent sample locations established during the second Forest Survey in Virginia, completed in 1957. In counties where there were not enough permanent sample locations to meet established limits of error, additional sample plots were selected from the grid points on the aerial photographs. The initial estimates of area within land-use classes obtained from the aerial photographs were either verified or adjusted on the basis of the ground check.

A 10-point cluster of plots systematically spaced on an acre was measured at each sample location using a basal-area factor of 37.5 square feet per acre. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers. All the new inventory information is based on the measurements and data collected on the 10-point clusters.

3. The permanent sample plots established in 1956 and 1957 were reconstructed where possible, and their remeasurement provided the primary estimates of growth, cut, and mortality. Approximately 100 active logging

operations in Virginia were sampled to relate timber utilization to timber inventory.

4. Equations prepared from detailed measurements collected on the trees tallied at one out of every ten sample locations were used to compute the volumes of individual tally trees. A mirror-caliper and sectional, aluminum poles were used to obtain the additional measurements on standing trees required to construct the volume equations. The same 10-percent subsample of plots used for the tree-volume study also served as a quality control of field measurements.

5. Ownership information was collected from local contacts, correspondence, and public records. In those counties where the sample missed a particular ownership class, temporary sample plots were added and measured to describe the forest conditions within the ownership class.

6. All field data were sent to Asheville for editing and were punched in cards for machine computing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

On National Forest lands the procedure as described was altered slightly to take full advantage of the cooperation received from the George Washington and the Jefferson National Forests.

DEFINITIONS OF TERMS

Land Use Classes

Forest land.—Land at least 10 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use.

Commercial forest land.—Forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Includes areas suitable for management to grow crops of industrial wood generally capable of producing in excess of 20 cubic feet per acre of annual growth. Includes both accessible and inaccessible areas.

Noncommercial forest land.—Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and productive forest land withdrawn from commercial timber use through statute or administrative regulation.

Productive-reserved forest land.—Productive public forest land withdrawn from timber utilization through statute or administrative regulation.

Unproductive forest land.—Forest land incapable of yielding crops of industrial wood because of adverse site conditions. Includes sterile or poorly drained forest land and steep rocky areas where topographic conditions are likely to prevent management for timber production.

Nonforest land.—Land that has never supported forests and lands formerly forested where use of timber is precluded by development for nonforest uses, such as crops, improved pasture, residential areas, and city parks. Also includes improved roads and adjoining rights-of-way, powerline clearings, and certain areas of water classified by the Bureau of the Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forest areas must be more than one acre in size, to qualify as nonforest land.

Cropland.—Land under cultivation within the past 24 months, including orchards and land in soil improving crops, but excluding land cultivated in developing improved pasture. Also includes idle farmland that has not been tended within the past 24 months but is less than 10 percent stocked with trees.

Pasture and range.—Land which is currently improved for grazing by cultivation, seeding, irrigation, fencing, or clearing of wood or brush growth, including land forested but developed for pasture, and open natural rangeland not 10 percent stocked with trees.

Ownership Classes

National Forest.—Federal lands which have been designated by Executive order or statute as National Forests or purchase units, and other lands under the administration of the Forest Service.

Other Federal.—Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and miscellaneous Federal agencies.

Indian lands.—Tribal lands held in fee by the Federal Government but administered for Indian tribal groups, and Indian trust allotments.

Miscellaneous Federal.—Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

State.—Lands owned by States, or lands leased by States for more than 50 years.

County and municipal.—Lands owned by counties or municipalities, or lands leased by these governmental units for more than 50 years.

Forest industry.—Lands owned by companies or individuals operating wood-using plants.

Farmer-owned.—Lands owned by operators of farms. (A farm is defined as a place operated as a unit of 10 or more acres from which the sale of agricultural

products totaled $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products totaled $250 or more annually during the previous year.)

Miscellaneous private.—Privately owned lands other than forest industry or farmer-owned.

Stand-Size Classes

Sawtimber stands.—Stands at least 10 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber and poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands at least 10 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber and poletimber trees, and with poletimber stocking exceeding that of sawtimber stocking.

Sapling-seedling stands.—Stands at least 10 percent stocked with growing-stock trees with more than half of this stocking in saplings and seedlings.

Nonstocked areas.—Commercial forest lands less than 10 percent stocked with growing-stock trees.

Stocking

A measure of area occupancy by trees of specified classes based on a minimum standard of 75 square feet of basal area per acre. Three categories of stocking are considered in the Survey: (1) all live trees, (2) growing-stock trees, and (3) desirable trees. Stocking in terms of all live trees is used in the delineation of forest land and forest types. Stocking in terms of growing-stock trees is used in stand-size and age classifications. Stocking in terms of desirable trees is used in delineating area condition classes.

Basal area.—The area in square feet of the cross section at breast height of a single tree or of the trees in a stand, usually expressed as square feet per acre.

Forest Type Groups

White pine-hemlock.—Forests in which 50 percent or more of the stand is eastern white pine or hemlock, singly or in combination. (Common associates include birch and maple.)

Spruce-fir.—Forests in which 50 percent or more of the stand is spruce or true firs, singly or in combination. (Common associates include whitecedar, tamarack, maple, birch, and hemlock.)

Loblolly-shortleaf pine.—Forests in which 50 percent or more of the stand is loblolly pine, shortleaf pine, or other southern yellow pines except longleaf or slash pine, singly or in combination. (Common associates include oak, hickory, and gum.)

Oak-pine.—Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern pines make up 25-49 percent of the stand. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.—Forests in which 50 percent or more of the stand is upland oaks or hickory, singly or in combination, except where pines comprise 25-49 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress.—Bottom-land forests in which 50 percent or more of the stand is tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, except where pines comprise 25-49 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood.—Forests in which 50 percent or more of the stand is elm, ash, or cottonwood, singly or in combination. (Common associates include willow, sycamore, beech, and maple.)

Maple-beech-birch.—Forests in which 50 percent or more of the stand is maple, beech, or yellow birch, singly or in combination. (Common associates include hemlock, elm, basswood, and white pine.)

Tree Species

Commercial species.—Tree species presently or prospectively suitable for industrial wood products; excludes so-called weed species, such as blackjack oak and hawthorn.

Hardwoods.—Dicotyledonous trees, usually broadleaved and deciduous. Soft-textured hardwoods include boxelder, red and silver maple, buckeye, hackberry, loblolly-bay, silverbell (in Mts.), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm. Hard-textured hardwoods include Florida and sugar maple, birch, hickory, dogwood, persimmon (forest-grown), beech, ash, honeylocust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Site Quality Classes

Site classes represent a classification of forest land in terms of inherent capacity to grow crops of industrial wood.

Site classifications are based upon the mean annual growth of growing stock (not including thinnings) attainable in fully stocked stands at culmination of mean annual growth. Height-age relationships are used as indicators of the specified volume-site classes. Five site-quality classes are recognized:

Class 1.—Sites capable of producing 165 or more cubic feet per acre annually.

Class 2.—Sites capable of producing 120 to 165 cubic feet per acre annually.

Class 3.—Sites capable of producing 85 to 120 cubic feet per acre annually.

Class 4.—Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 5.—Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

Area Condition Classes

A classification of commerical forest land based upon stocking by desirable trees and other conditions affecting current and prospective timber growth.

Class 10.—Areas 100 percent or more stocked with desirable trees and not overstocked. Stands in this category generally do not require any treatment at present to maintain high level of growth.

Class 20.—Areas 100 percent or more stocked with desirable trees and overstocked. Stands in this category need a treatment, such as thinning, to produce maximum levels of growth of desirable trees.

Class 30.—Areas 60 to 100 percent stocked with desirable trees and with less than 30 percent of the area controlled by acceptable growing-stock trees, rough or rotten trees, inhibiting vegetation, slash, or nonstockable conditions. Stands in this category generally have conditions favorable for natural improvement of stocking without special treatment.

Class 40.—Areas 60 to 100 percent stocked with desirable trees and with 30 percent or more of the area controlled by other trees, or conditions that ordinarily prevent occupancy by desirable trees. Stands in this category generally have little prospect for improvement in desirable tree stocking without special treatment.

Class 50.—Areas less than 60 percent stocked with desirable trees, but with 100 percent or more stocking with growing-stock trees. Stands in this category generally have little prospect for improved desirable tree stocking without special treatment. Stands almost to rotation age would usually not be treated.

Class 60.—Areas less than 60 percent stocked with desirable trees, but with 60 to 100 percent stocking with growing-stock trees. Stands in this category generally have little prospect for improved desirable tree stocking without special treatment.

Class 70.—Areas less than 60 percent stocked with desirable trees and with less than 60 percent stocking with growing-stock trees. Stands in this category generally have little prospect for improved desirable-tree or growing-stock stocking without treatment.

Class of Timber

Growing-stock trees.—Sawtimber trees, poletimber trees, saplings, and seedlings; that is, all live trees except rough and rotten trees.

Sawtimber trees.—Live trees of commercial species 9.0 inches and larger in diameter at breast height for softwoods and 11.0 inches and larger in diameter at breast height for hardwoods, and containing at least one 12-foot saw log.

Poletimber trees.—Live trees of commercial species at least 5.0 inches in diameter at breast height but smaller than sawtimber size, and of good form and vigor.

Saplings.—Live trees of commercial species 1.0 to 5.0 inches in diameter at breast height and of good form and vigor.

Seedlings.—Live trees of commercial species less than 1.0 inch in diameter at breast height that are expected to survive, according to regional standards.

Desirable trees.—Growing-stock trees with no serious defects in quality limiting present or prospective use; of relatively high vigor and containing no pathogens that may result in death or serious deterioration before rotation age. They include the type of trees forest managers aim to grow; that is, the trees left in silvicultural cutting or favored in cultural operations.

Acceptable trees.—Trees meeting the specifications for growing stock but not qualifying as desirable trees.

Rough trees.—Live trees that do not contain at least one 12-foot saw log now or prospectively, primarily because of roughness, poor form, or noncommercial species.

Rotten trees.—Live trees that do not contain at least one 12-foot saw log now or prospectively, primarily because of rot.

Salvable dead trees.—Standing or down dead trees that are considered currently or potentially merchantable.

Saw-log Specifications

Saw-log portion.—That part of the bole of sawtimber trees between the stump and the merchantable top.

Merchantable top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. Minimum merchantable top is 7.0 inches d.o.b. for softwoods, and 9.0 inches d.o.b. for hardwoods.

Saw log.—A log meeting minimum approved log-grade specifications, or for species for which approved log grades are lacking; at least 8' long, with a minimum d.i.b. of 6", and with deduction for defect no greater than two-thirds the gross volume.

Log grades.—A classification of logs based on external characteristics as indicators of quality or value.

White pine quality classes are based on the revised trial specifications for white pine log grades prepared by the Northeastern Forest Experiment Station in 1960. Other softwood quality classes are based on standards presented in "Forest Service Log Grades for Southern Pine," issued by the Southeastern Forest Experiment Station in 1964.

Hardwood quality classes are based on "Hardwood Log Grades for Standard Lumber," issued by the Forest Products Laboratory under the designation D1737 in 1949. Hardwood log grades include, in addition to the log grades for standard lumber, a grade 4 tie and timber log. A grade 4 hardwood log must be sound internally, and no single knot or group of knots within a 6-inch section of the log can exceed one-third the log diameter at that point. Rotten defects or holes can be present on the surface of the log, but they must not extend more than 3 inches into the potential tie or timber. Sweep departure cannot exceed one-fourth the log scaling diameter per 8 feet of length.

Diameters

D.b.h. (Diameter at breast height).—Tree diameter in inches, outside bark, measured at 4½ feet above ground.

Diameter classes.—The 2-inch diameter classes extend from 1.0 inch below to 0.9 inch above the stated midpoint. For example, the 6-inch class includes trees 5.0-6.9 inches d.b.h., inclusive.

Volume

Volume of sawtimber.—Net volume of the saw-log portion of live sawtimber trees in board feet International 1/4-inch rule.

Volume of growing stock.—Volume of sound wood in the bole of sawtimber and poletimber trees from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

Volume of timber.—The volume of sound wood in the bole of growing stock, rough or rotten, and salvable dead trees 5.0 inches and larger in diameter at breast height, from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

Standard cord.—A stacked pile of round or split bolts of wood, including bark, encompassing 128 cubic feet. See "Conversion Factors" for cubic-foot content of solid wood per average cord.

Growth and Timber Cut

Net annual growth of growing stock.—The annual change in volume of sound wood in live sawtimber and poletimber trees resulting from natural causes.

Net annual growth of sawtimber.—The annual change in net board-foot volume of live sawtimber trees resulting from natural causes.

Mortality of growing stock.—The volume of sound wood in live sawtimber and poletimber trees dying annually from natural causes.

Mortality of sawtimber.—The net board-foot volume of sawtimber trees dying annually from natural causes.

Timber cut from growing stock.—The volume of sound wood in live sawtimber and poletimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber cut from sawtimber.—The net board-foot volume of live sawtimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber products.—Roundwood products and byproducts of wood manufacturing plants.

Conversion Factors

Cubic feet of wood per average cord (excluding bark)

D.b.h.	Pine	Other softwoods	Hardwood
6	61.2	64.9	59.8
8	68.0	71.2	68.3
10	72.9	76.9	73.3
12	76.5	81.3	76.3
14	79.3	83.3	78.4
16	81.5	85.7	79.8
18	83.3	88.5	80.8
20	84.7	89.4	81.6
22-28	86.6	92.2	82.6
30+	90.2	97.3	83.9
Average	72.5	80.0	74.4

Rough cords per M cubic feet (without bark) $= a+b\left(\frac{1}{\text{D.b.h.}}\right)+c\left(\frac{1}{\text{D.b.h.}}\right)^2$

Where		*Pine*	*Other softwoods*	*Hardwood*
a	=	10.01850	9.15960	11.68410
b	=	34.42135	28.75793	3.74431
c	=	22.73994	25.54418	157.39417

INDEX TO DETAILED TABLES

Area

1. Area by land classes
2. Area of commercial forest land, by ownership classes
3. Area of commercial forest land, by stand-size and ownership classes
4. Area of commercial forest land, by stand-volume and ownership classes
5. Area of commercial forest land, by area-condition and ownership classes
6. Area of commercial forest land, by stocking classes based on alternative stand components
7. Area of commercial forest land, by site and ownership classes
8. Area of commercial forest land, by forest types and ownership classes
9. Area of noncommercial forest land, by forest types

Volume

10. Number of growing-stock trees on commercial forest land, by species and diameter classes
11. Volume of timber on commercial forest land, by class of timber and by softwood and hardwood
12. Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
13. Volume of growing stock on commercial forest land, by species and diameter classes
14. Volume of sawtimber on commercial forest land, by species and diameter classes
15. Volume of sawtimber on commercial forest land, by species and log grade

Growth, Cut, and Mortality

16. Net annual growth and cut of growing stock on commercial forest land, by species
17. Net annual growth and cut of growing stock on commercial forest land, by ownership classes and by softwood and hardwood
18. Net annual growth and cut of sawtimber on commercial forest land, by species
19. Net annual growth and cut of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
20. Annual mortality of growing stock and sawtimber on commercial forest land, by species
21. Annual mortality of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
22. Annual mortality of growing stock and sawtimber on commercial forest land, by causes and by softwood and hardwood

Utilization

23. Total output of timber products, by product, by type of material used, and by softwood and hardwood
24. Total output of roundwood, by product, by source, and by softwood and hardwood
25. Annual timber cut from growing stock on commercial forest land, by product and logging residues, and by softwood and hardwood
26. Annual timber cut from live sawtimber on commercial forest land, by product and logging residues, and by softwood and hardwood
27. Volume of unused wood material at primary manufacturing plants, by industrial source and type of residues, and by softwood and hardwood

Projections

28. Timber growth, available cut, and inventory of sawtimber and growing stock, by softwood and hardwood, 1965 to 1995

Supplemental Tables

29. Volume of growing stock and sawtimber on commercial forest land, by stand-size classes and by softwood and hardwood
30. Basal area per acre of growing stock and rough and rotten trees 5.0 inches d.b.h. and larger, by forest type and Survey Unit
31. Number of growing-stock and rough and rotten trees 1.0-4.9 inches d.b.h. per acre, by forest type and Survey Unit
32. Average net volume per acre on commercial forest land, by area description and species group
33. Average net volume and growth per acre on commercial forest land, by ownership, tree class, and species group
34. Land area, by class and major forest type, 1940, 1957, and 1966
35. Volume of sawtimber, growing stock, and all timber, by species group and diameter class, 1940, 1957, and 1966
36. Volume of all timber, by species group and Survey Unit, 1940, 1957, and 1966

County Tables

37. Land area and commercial forest, by county
38. Commercial forest land, by county and ownership
39. Volume of sawtimber and growing stock, by county and species group
40. Annual cut of growing stock and sawtimber, by county
41. Net annual growth of growing stock and sawtimber, by county

Table 1.—*Area by land classes, Virginia, 1966*

Land class	Area
	Thousand acres
Forest land:	
Commercial	15,809.3
Productive-reserved	313.5
Unproductive	216.2
Total	16,339.0
Nonforest land:	
Cropland	3,604.9
Pasture and range	3,588.3
Other[1]	1,970.0
Total	9,163.2
All land [2]	25,502.2

[1] Includes swampland, industrial and urban areas, other nonforest land, and 136,400 acres classed as water by Forest Survey standards but defined by Bureau of Census as land.

[2] From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

Table 2.—*Area of commercial forest land, by ownership classes, Virginia, 1966*

Ownership class	Area
	Thousand acres
National Forest	1,202.8
Other Federal:	
Indian	0.5
Miscellaneous Federal	233.9
Total other Federal	234.4
State	181.6
County and municipal	53.1
Forest industry	1,562.3
Farmer-owned	6,958.2
Miscellaneous private	5,616.9
All ownerships	15,809.3

Table 3.—*Area of commercial forest land, by stand-size and ownership classes, Virginia, 1966*

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
			Thousand acres		
Sawtimber	5,293.5	619.5	199.6	492.9	3,981.5
Poletimber	5,966.9	492.5	199.9	481.0	4,793.5
Sapling and seedling	4,452.4	75.8	69.3	582.6	3,724.7
Nonstocked areas	96.5	15.0	0.3	5.8	75.4
All classes	15,809.3	1,202.8	469.1	1,562.3	12,575.1

Table 4.—*Area of commercial forest land, by stand-volume and ownership classes, Virginia, 1966*

Stand volume per acre[1]	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
			Thousand acres		
Less than 1,500 board feet	7,794.8	499.1	164.1	776.7	6,354.9
1,500 to 5,000 board feet	5,819.4	562.7	212.8	495.9	4,548.0
More than 5,000 board feet	2,195.1	141.0	92.2	289.7	1,672.2
All classes	15,809.3	1,202.8	469.1	1,562.3	12,575.1

[1] Volume, International ¼-inch rule.

Table 5.—*Area of commercial forest land, by area-condition and ownership classes, Virginia, 1966*

Area-condition class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
			Thousand acres		
10	1,025.7	19.9	33.2	174.2	798.4
20	173.4	—	13.6	42.8	117.0
30	1,478.2	74.3	47.0	229.3	1,127.6
40	1,643.8	201.2	77.3	206.2	1,159.1
50	1,469.5	43.0	55.3	199.6	1,171.6
60	5,749.7	283.3	174.1	418.9	4,873.4
70	4,269.0	581.1	68.6	291.3	3,328.0
All classes	15,809.3	1,202.8	469.1	1,562.3	12,575.1

Table 6.—*Area of commercial forest land, by stocking classes based on alternative stand components, Virginia, 1966*

Stocking percentage	Stocking class					
	All live trees	Growing stock	Rough and rotten trees	Inhibiting vegetation	Non-stocked	Non-stockable
			Thousand acres			
160	3.0	—	—	—	—	—
150-160	30.4	—	—	—	—	—
140-150	337.2	20.9	—	—	—	—
130-140	1,884.5	181.0	5.3	—	—	—
120-130	3,129.8	418.6	6.7	—	—	—
110-120	3,536.0	784.5	41.8	—	—	—
100-110	2,709.8	1,343.3	57.9	—	—	—
90-100	1,787.4	1,949.2	138.7	—	5.9	—
80-90	1,070.5	2,306.9	257.6	—	3.6	—
70-80	524.4	2,364.3	420.8	—	23.8	—
60-70	310.7	2,171.6	874.7	3.5	64.1	29.9
50-60	169.4	1,661.7	1,473.5	3.5	77.6	14.8
40-50	125.2	1,102.5	2,278.6	39.2	132.0	25.2
30-40	119.5	711.2	3,041.6	50.4	174.7	66.8
20-30	29.5	452.5	3,033.4	105.9	455.3	183.6
10-20	29.0	244.5	2,703.1	423.8	1,540.4	252.4
Less than 10	13.0	96.6	1,475.6	15,183.0	13,331.9	15,236.6
All areas	15,809.3	15,809.3	15,809.3	15,809.3	15,809.3	15,809.3

Table 7.—*Area of commercial forest land, by site and ownership classes, Virginia, 1966*

Site class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
			Thousand acres		
165 cu. ft. or more	126.1	—	1.7	3.2	121.2
120 to 165 cu. ft.	289.3	7.1	10.5	18.2	253.5
85 to 120 cu. ft.	1,699.2	38.4	76.5	203.1	1,381.2
50 to 85 cu. ft.	8,929.5	608.3	276.9	961.9	7,082.4
Less than 50 cu. ft.	4,765.2	549.0	103.5	375.9	3,736.8
All classes	15,809.3	1,202.8	469.1	1,562.3	12,575.1

Table 8.—*Area of commercial forest land, by forest types and ownership classes, Virginia, 1966*

Type	All ownerships	Public	Private
		Thousand acres	
Softwood types:			
White pine-hemlock	61.3	8.5	52.8
Loblolly-shortleaf pine:			
Loblolly pine	1,115.9	38.3	1,077.6
Shortleaf pine	339.0	15.2	323.8
Virginia pine	1,245.7	71.3	1,174.4
Eastern redcedar	121.0	—	121.0
Pitch pine	63.6	31.2	32.4
Table-Mountain pine	32.8	12.9	19.9
Pond pine	2.6	—	2.6
Total	2,920.6	168.9	2,751.7
Total softwoods	2,981.9	177.4	2,804.5
Hardwood types:			
Oak-pine	2,537.3	210.5	2,326.8
Oak-hickory	9,823.8	1,259.8	8,564.0
Oak-gum-cypress	254.7	6.1	248.6
Elm-ash-cottonwood	116.4	—	116.4
Maple-beech-birch	95.2	18.1	77.1
Total hardwoods	12,827.4	1,494.5	11,332.9
All types	15,809.3	1,671.9	14,137.4

Table 9.—*Area of noncommercial forest land, by forest types, Virginia, 1966*

Type	All areas	Productive-reserved areas	Unproductive areas
		Thousand acres	
White-red-jack pine	2.0	2.0	—
Spruce-fir	0.4	0.4	—
Loblolly-shortleaf pine	16.1	11.4	4.7
Oak-pine	68.8	56.0	12.8
Oak-hickory	431.2	233.6	197.6
Oak-gum-cypress	9.7	9.7	—
Maple-beech-birch	1.5	0.4	1.1
All types	529.7	313.5	216.2

Table 10.—*Number of growing-stock trees on commercial forest land, by species and diameter classes, Virginia, 1966*

Species	Diameter class (inches at breast height)										
	All classes	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
					Thousand trees						
Softwood:											
Shortleaf pine	110,644	49,492	33,529	17,357	6,971	2,268	673	250	59	41	4
Loblolly pine	179,216	66,302	43,239	29,600	18,563	11,369	5,668	2,705	1,179	568	23
Virginia pine	191,200	104,273	55,378	21,152	7,572	2,187	469	134	35	—	—
Pond pine	811	221	114	187	96	117	21	26	24	5	—
Table-Mountain pine	7,378	3,966	1,043	1,476	533	212	115	22	8	3	—
Pitch pine	27,140	10,738	7,018	4,559	2,689	1,258	620	182	50	26	—
Eastern white pine	17,259	7,050	4,573	2,139	1,544	892	484	270	148	148	11
Spruce and balsam fir	76	—	22	33	16	—	5	—	—	—	—
Hemlock	7,483	2,939	1,592	1,021	796	320	338	234	102	112	29
Cypress	1,691	198	149	406	322	251	106	111	50	82	16
Redcedar [1]	13,286	9,396	2,291	994	390	171	15	14	15	—	—
Total	556,184	254,575	148,948	78,924	39,492	19,045	8,514	3,948	1,670	985	83
Hardwood:											
Select white oaks[2]	167,919	70,126	37,251	24,675	15,890	9,920	5,020	2,516	1,242	1,127	152
Select red oaks [3]	53,795	19,472	11,152	8,016	5,271	3,756	2,373	1,453	912	1,235	155
Other white oaks	134,074	57,603	31,335	17,486	11,015	7,418	4,123	2,099	1,286	1,586	123
Other red oaks	175,706	70,968	44,883	24,858	16,279	9,039	4,687	2,525	1,114	1,221	132
Hickory	92,764	38,846	22,272	13,301	8,105	4,913	2,799	1,389	605	498	36
Hard maple	8,163	3,971	1,875	681	635	421	230	187	49	100	14
Soft maple	68,497	37,181	15,912	6,441	4,372	2,024	1,165	643	379	350	30
Beech	13,816	4,812	2,649	1,896	1,311	1,167	783	605	223	347	23
Sweetgum	65,982	30,906	15,142	8,740	5,314	2,949	1,356	774	456	321	24
Tupelo and blackgum	35,384	15,333	8,461	4,451	2,954	2,041	1,102	554	226	236	26
Ash	14,837	6,348	3,288	2,333	1,368	598	404	232	135	118	13
Cottonwood	416	281	39	23	21	13	—	26	13	—	—
Yellow birch	1,540	653	639	137	50	28	16	4	4	9	—
Basswood	7,140	2,774	1,782	1,025	644	389	230	141	66	89	—
Yellow-poplar	102,904	36,697	24,658	17,633	10,291	6,287	3,607	1,931	945	781	74
Black walnut	6,248	2,033	1,703	1,153	546	413	145	166	58	31	—
Elm	10,078	4,888	2,503	1,201	712	409	214	52	39	58	2
Sycamore	7,491	2,565	1,934	890	791	508	285	204	143	152	19
Black cherry	3,192	1,678	852	309	163	126	38	—	17	9	—
Other eastern hardwoods	52,319	27,537	12,010	5,933	3,326	1,592	920	452	308	222	19
Total	1,022,265	434,672	240,340	141,182	89,058	54,011	29,497	15,953	8,220	8,490	842
All species	1,578,449	689,247	389,288	220,106	128,550	73,056	38,011	19,901	9,890	9,475	925

[1]Includes 128,000 white-cedar trees.
[2]Includes white, swamp white, swamp chestnut, and chinkapin oaks.
[3]Includes cherrybark, Shumard, and northern red oaks.

Table 11.—*Volume of timber on commercial forest land, by class of timber and by softwood and hardwood, Virginia, 1966*

Class of timber	All species	Softwood	Hardwood
	Million cubic feet		
Sawtimber trees:			
Saw-log portion	8,191.1	2,636.8	5,554.3
Upper-stem portion	1,135.2	193.1	942.1
Total	9,326.3	2,829.9	6,496.4
Poletimber trees	5,458.9	1,457.6	4,001.3
All growing-stock trees	14,785.2	4,287.5	10,497.7
Rough trees:			
Sawtimber-size trees	1,281.6	136.0	1,145.6
Poletimber-size trees	1,606.8	186.3	1,420.5
Total	2,888.4	322.3	2,566.1
Rotten trees:			
Sawtimber-size trees	519.5	12.7	506.8
Poletimber-size trees	82.6	1.9	80.7
Total	602.1	14.6	587.5
Salvable dead trees:			
Sawtimber-size trees	1.7	1.2	0.5
Poletimber-size trees	2.2	0.6	1.6
Total	3.9	1.8	2.1
Total, all timber	18,279.6	4,626.2	13,653.4

Table 12.—*Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Virginia, 1966*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet* [1]		
National Forest	1,075.3	174.8	900.5	3,011.8	615.4	2,396.4
Other public	533.2	186.9	346.3	1,358.9	520.2	838.7
Forest industry	1,570.1	722.7	847.4	4,157.7	2,165.0	1,992.7
Farmer and misc. private	11,606.6	3,203.1	8,403.5	29,507.5	8,468.1	21,039.4
All ownerships	14,785.2	4,287.5	10,497.7	38,035.9	11,768.7	26,267.2

[1] International ¼-inch rule.

Table 13.—*Volume of growing stock on commercial forest land, by species and diameter classes, Virginia, 1966*

Species	Diameter class (inches at breast height)										
	All classes	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million cubic feet										
Softwood:											
Shortleaf pine	755.3	112.6	204.9	200.7	129.7	60.1	25.6	12.7	4.3	3.9	0.8
Loblolly pine	1,788.1	128.1	231.8	315.4	335.1	304.7	210.0	133.2	74.8	51.1	3.9
Virginia pine	1,135.6	269.4	358.4	267.0	150.4	62.4	18.2	7.2	2.6	—	—
Pond pine	11.5	0.4	0.7	1.7	1.5	2.8	0.9	1.2	1.9	0.4	—
Table-Mountain pine	47.8	9.6	5.9	14.4	7.9	4.8	3.6	1.1	0.4	0.1	—
Pitch pine	203.2	19.7	35.4	41.7	42.4	29.4	21.2	8.3	2.8	2.3	—
Eastern white pine	157.2	14.4	22.3	20.8	22.9	21.8	16.4	12.9	9.1	14.5	2.1
Spruce and balsam fir	0.7	—	0.1	0.3	0.2	—	0.1	—	—	—	—
Hemlock	90.8	5.9	7.2	8.8	14.2	7.9	12.0	11.9	6.4	11.2	5.3
Cypress	46.8	0.7	1.0	4.5	7.1	8.0	4.1	6.5	3.6	8.0	3.3
Redcedar [1]	50.5	18.2	10.9	9.2	6.6	3.9	0.6	0.4	0.7	—	—
Total	4,287.5	579.0	878.6	884.5	718.0	505.8	312.7	195.4	106.6	91.5	15.4
Hardwood:											
Select white oaks [2]	1,799.2	172.4	227.0	283.4	299.4	276.0	191.8	126.6	81.3	107.7	33.6
Select red oaks [3]	780.1	46.7	67.9	91.8	97.6	102.1	90.8	71.8	59.6	120.7	31.1
Other white oaks	1,282.4	125.3	170.9	176.3	178.0	177.6	135.6	92.5	71.2	132.9	22.1
Other red oaks	1,729.6	166.1	264.7	271.0	288.2	236.3	171.0	122.4	68.9	115.7	25.3
Hickory	891.9	81.6	120.7	139.6	145.3	131.7	104.8	71.9	40.2	49.3	6.8
Hard maple	86.1	9.5	11.9	7.4	11.6	10.9	8.6	9.1	4.1	10.6	2.4
Soft maple	551.8	97.0	99.4	74.8	81.8	57.6	45.5	31.8	25.1	33.0	5.8
Beech	217.2	11.9	15.9	20.8	23.2	31.2	29.4	31.6	14.7	33.9	4.6
Sweetgum	622.1	61.7	89.2	103.6	110.1	89.4	57.7	42.1	31.7	31.5	5.1
Tupelo and blackgum	366.4	33.0	49.1	50.0	56.4	58.1	44.1	29.4	15.4	24.4	6.5
Ash	155.0	16.3	18.7	27.2	26.5	15.8	16.3	12.0	8.6	11.1	2.5
Cottonwood	3.9	0.8	0.2	0.3	0.2	0.3	—	1.2	0.9	—	—
Yellow birch	11.4	2.5	4.2	1.4	1.0	0.9	0.4	0.2	0.2	0.6	—
Basswood	86.7	7.2	12.0	13.2	13.4	11.9	9.1	7.2	4.9	7.8	—
Yellow-poplar	1,246.4	93.2	154.8	210.9	197.5	181.8	145.6	103.5	65.8	77.9	15.4
Black walnut	55.5	4.2	7.8	10.7	7.7	8.9	4.6	7.0	2.6	2.0	—
Elm	83.2	10.7	14.3	12.9	13.7	11.2	8.6	2.8	2.5	6.0	0.5
Sycamore	106.9	7.1	12.0	10.6	15.8	13.9	10.4	9.8	8.9	14.8	3.6
Black cherry	21.5	4.1	5.0	3.2	2.9	3.2	1.4	—	0.9	0.8	—
Other eastern hardwoods	400.4	64.8	68.2	62.2	58.8	43.3	34.6	22.8	20.2	21.8	3.7
Total	10,497.7	1,016.1	1,413.9	1,571.3	1,629.1	1,462.1	1,110.3	795.7	527.7	802.5	169.0
All species	14,785.2	1,595.1	2,292.5	2,455.8	2,347.1	1,967.9	1,423.0	991.1	634.3	894.0	184.4

[1] Includes 0.4 million cubic feet of Atlantic white-cedar.
[2] Includes white, swamp white, swamp chestnut, and chinkapin oaks.
[3] Includes cherrybark, Shumard, and northern red oaks.

Table 14.—*Volume of sawtimber on commercial forest land, by species and diameter classes, Virginia, 1966*

Species	Diameter class (inches at breast height)								
	All classes	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 & larger
	Million board feet								
Softwood:									
Shortleaf pine	1,729.0	703.6	541.1	265.5	114.9	59.7	20.1	20.3	3.8
Loblolly pine	6,234.9	1,103.0	1,440.0	1,407.9	1,005.0	645.6	367.5	248.2	17.7
Virginia pine	1,818.4	873.4	575.1	252.4	75.4	30.3	11.8	—	—
Pond pine	46.8	6.7	6.7	11.9	3.8	5.5	9.9	2.3	—
Table-Mountain pine	132.9	54.0	33.3	21.0	16.6	5.2	1.9	0.9	—
Pitch pine	630.9	147.6	179.7	136.1	100.0	41.5	14.5	11.5	—
Eastern white pine	536.8	72.6	96.1	101.5	79.5	61.9	44.2	70.4	10.6
Spruce and balsam fir	2.1	1.1	0.7	—	0.3	—	—	—	—
Hemlock	368.2	28.4	58.7	37.5	58.9	61.5	34.2	58.9	30.1
Cypress	203.4	10.8	29.9	37.0	19.1	32.6	17.5	39.0	17.5
Redcedar	65.3	25.5	21.9	11.7	2.3	1.7	2.2	—	—
Total	11,768.7	3,026.7	2,983.2	2,282.5	1,475.8	945.5	523.8	451.5	79.7
Hardwood:									
Select white oaks [1]	4,374.8	—	1,004.7	1,104.3	789.6	534.3	343.6	451.5	146.8
Select red oaks [2]	2,328.2	—	327.2	405.3	364.3	306.0	251.1	531.1	143.2
Other white oaks	3,284.5	—	615.6	706.2	557.7	402.5	303.0	597.5	102.0
Other red oaks	4,136.4	—	985.2	950.2	727.7	533.3	311.1	521.1	107.8
Hickory	2,332.1	—	513.5	545.7	467.7	337.6	190.5	243.8	33.3
Hard maple	235.4	—	40.9	43.0	38.4	36.7	19.4	47.0	10.0
Soft maple	1,042.2	—	260.1	216.0	174.4	127.9	97.4	142.4	24.0
Beech	713.3	—	84.5	124.8	122.5	139.2	61.7	156.8	23.8
Sweetgum	1,502.1	—	378.2	364.2	253.2	192.0	149.6	142.5	22.4
Tupelo and blackgum	883.0	—	165.2	213.3	176.4	120.6	66.6	108.5	32.4
Ash	347.9	—	80.5	56.6	63.7	49.6	39.7	46.3	11.5
Cottonwood	11.3	—	0.9	0.9	—	5.3	4.2	—	—
Yellow birch	13.3	—	4.1	3.5	1.5	0.7	0.9	2.6	—
Basswood	228.7	—	48.9	44.2	39.8	32.7	25.3	37.8	—
Yellow-poplar	3,492.4	—	716.3	798.9	691.0	509.5	317.4	383.1	76.2
Black walnut	124.8	—	26.2	34.0	18.2	27.3	11.4	7.7	—
Elm	147.2	—	41.0	35.6	28.8	9.9	9.8	19.7	2.4
Sycamore	320.9	—	54.5	58.6	44.3	41.2	37.8	68.6	15.9
Black cherry	31.4	—	10.2	11.1	4.9	—	2.7	2.5	—
Other eastern hardwoods	717.3	—	169.2	144.4	126.8	87.6	77.9	93.1	18.3
Total	26,267.2	—	5,526.9	5,860.8	4,690.9	3,493.9	2,321.1	3,603.6	770.0
All species	38,035.9	3,026.7	8,510.1	8,143.3	6,166.7	4,439.4	2,844.9	4,055.1	849.7

[1] Includes white, swamp white, swamp chestnut, and chinkapin oaks.
[2] Includes cherrybark, Shumard, and northern red oaks.

Table 15.—*Volume of sawtimber on commercial forest land, by species and log grade, Virginia, 1966*

Species	All grades	Grade 1 logs	Grade 2 logs	Grade 3 logs	Grade 4 logs
	Million board feet				
Softwood:					
Yellow pines	10,592.9	213.6	1,592.2	5,877.4	2,909.7
Eastern white pine	536.8	20.2	56.0	301.3	159.3
Spruce and balsam fir	2.1	0.2	0.9	0.7	0.3
Cypress	203.4	30.7	87.9	82.8	2.0
Other eastern softwoods	433.5	5.6	27.7	235.1	165.1
Total	11,768.7	270.3	1,764.7	6,497.3	3,236.4
Hardwood:					
Select white and red oaks	6,703.0	566.2	1,111.4	2,747.1	2,278.3
Other white and red oaks	7,420.9	414.2	967.6	3,001.9	3,037.2
Hickory	2,332.1	115.9	313.7	828.1	1,074.4
Yellow birch	13.3	0.7	1.8	9.8	1.0
Hard maple	235.4	14.7	31.4	106.0	83.3
Sweetgum	1,502.1	95.5	194.3	614.8	597.5
Ash, walnut, and black cherry	504.1	37.7	108.4	285.4	72.6
Yellow-poplar	3,492.4	187.4	403.0	1,177.9	1,724.1
Other hardwoods	4,063.9	305.0	676.0	1,599.4	1,483.5
Total	26,267.2	1,737.3	3,807.6	10,370.4	10,351.9
All species	38,035.9	2,007.6	5,572.3	16,867.7	13,588.3

Table 16.—*Net annual growth and cut of growing stock on commercial forest land, by species, Virginia, 1965*

Species	Net annual growth	Annual timber cut [1]
	Million cubic feet	
Softwood:		
Yellow pines	156.1	188.3
Eastern white pine	7.0	5.1
Spruce and balsam fir	(2)	—
Cypress	1.6	0.9
Other eastern softwoods	6.0	2.6
Total	170.7	196.9
Hardwood:		
Select white and red oaks	89.5	70.0
Other white and red oaks	113.0	70.2
Hickory	22.1	10.3
Yellow birch	0.5	—
Hard maple	3.1	1.3
Sweetgum	19.1	19.7
Ash, walnut, & black cherry	7.2	6.1
Yellow-poplar	59.3	40.9
Other hardwoods	56.6	50.7
Total	370.4	269.2
All species	541.1	466.1

[1] Annual cut based on trend level between 1957 and 1965 as developed from the remeasurement of permanent sample plots.
[2] Negligible.

Table 17.—*Net annual growth and cut of growing stock on commercial forest land, by ownership classes and by softwood and hardwood, Virginia, 1965*

Ownership class	Net annual growth			Annual timber cut		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet					
National Forest	36.1	5.3	30.8	6.3	—	6.3
Other public	19.5	7.2	12.3	13.8	8.9	4.9
Forest industry	59.2	28.8	30.4	71.6	34.9	36.7
Farmer and misc. private	426.3	129.4	296.9	374.4	153.1	221.3
All ownerships	541.1	170.7	370.4	466.1	196.9	269.2

Table 18.—*Net annual growth and cut of sawtimber on commercial forest land, by species, Virginia, 1965*

Species	Net annual growth	Annual timber cut [1]
	Million board feet [2]	
Softwood:		
Yellow pines	467.0	508.3
Eastern white pine	29.4	24.4
Spruce and balsam fir	(3)	—
Cypress	7.3	5.1
Other eastern softwoods	16.5	7.2
Total	520.2	545.0
Hardwood:		
Select white and red oaks	269.1	202.4
Other white and red oaks	284.6	206.2
Hickory	64.8	29.4
Yellow birch	0.4	—
Hard maple	6.2	5.3
Sweetgum	57.4	50.1
Ash, walnut, and black cherry	16.9	13.1
Yellow-poplar	199.8	136.5
Other hardwoods	115.6	148.4
Total	1,014.8	791.4
All species	1,535.0	1,336.4

[1] Annual cut based on trend level between 1957 and 1965 as developed from the remeasurement of permanent sample plots.
[2] International ¼-inch rule.
[3] Negligible.

Table 19.—*Net annual growth and cut of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Virginia, 1965*

Ownership class	Net annual growth			Annual timber cut		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million board feet					
National Forest	96.0	18.1	77.9	19.6	—	19.6
Other public	54.7	19.5	35.2	41.4	26.8	14.6
Forest industry	180.0	93.8	86.2	207.4	109.5	97.9
Farmer and misc. private	1,204.3	388.8	815.5	1,068.0	408.7	659.3
All ownerships	1,535.0	520.2	1,014.8	1,336.4	545.0	791.4

Table 20.—*Annual mortality* [1] *of growing stock and sawtimber on commercial forest land, by species, Virginia, 1965*

Species	Growing stock	Sawtimber
	Million cubic feet	*Million board feet*
Softwood:		
Yellow pines	27.8	52.5
Eastern white pine	0.3	0.1
Spruce and balsam fir	—	—
Cypress	0.2	1.5
Other eastern softwoods	0.8	2.0
Total	29.1	56.1
Hardwood:		
Select white and red oaks	7.7	21.5
Other white and red oaks	16.1	33.9
Hickory	3.5	7.8
Yellow birch	—	—
Hard maple	0.2	0.8
Sweetgum	4.8	10.5
Ash, walnut, and black cherry	1.5	3.4
Yellow-poplar	3.8	11.8
Other hardwoods	12.0	29.6
Total	49.6	119.3
All species	78.7	175.4

[1] Based on annual mortality between 1957 and 1965 from the remeasurement of permanent sample plots.

Table 21.—*Annual mortality of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, Virginia, 1965*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
National Forest	3.4	0.4	3.0	10.5	0.5	10.0
Other public	3.7	2.0	1.7	9.8	5.1	4.7
Forest industry	9.4	5.2	4.2	25.1	10.4	14.7
Farmer and misc. private	62.2	21.5	40.7	130.0	40.1	89.9
All ownerships	78.7	29.1	49.6	175.4	56.1	119.3

Table 22.—*Annual mortality of growing stock and sawtimber on commercial forest land, by causes and by softwood and hardwood, Virginia, 1965*

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
Fire	2.3	0.9	1.4	6.3	3.1	3.2
Insects	5.2	5.2	—	12.5	12.5	—
Disease	2.6	0.7	1.9	11.5	2.7	8.8
Other	21.3	9.7	11.6	27.6	6.7	20.9
Unknown	47.3	12.6	34.7	117.5	31.1	86.4
All causes	78.7	29.1	49.6	175.4	56.1	119.3

Table 23.—*Total output of timber products, by product, by type of material used, and by softwood and hardwood, Virginia, 1965*

Product and species group	Unit	Total output		Output from roundwood		Output from plant byproducts	
		Standard units	*M cu. ft.*	*Standard units*	*M cu. ft.*	*Standard units*	*M cu. ft*
Industrial products:							
Saw logs:							
Softwood	M bd. ft.[1]	508,023	82,300	508,023	82,300	—	—
Hardwood	M bd. ft.[1]	613,707	99,424	613,707	99,424	—	—
Total	M bd. ft.[1]	1,121,730	181,724	1,121,730	181,724	—	—
Veneer logs and bolts:							
Softwood	M bd. ft.[1]	1,441	217	1,441	217	—	—
Hardwood	M bd. ft.[1]	47,412	7,214	47,412	7,214	—	—
Total	M bd. ft.[1]	48,853	7,431	48,853	7,431	—	—
Pulpwood:							
Softwood	Std. cds.[2]	1,650,918	114,265	1,423,972	93,840	226,946	20,425
Hardwood	Std. cds.[2]	770,074	58,971	670,174	49,980	99,900	8,991
Total	Std. cds.[2]	2,420,992	173,236	2,094,146	143,820	326,846	29,416
Miscellaneous industrial:							
Cooperage:							
Softwood	M bd. ft.[1]	—	—	—	—	—	—
Hardwood	M bd. ft.[1]	12,496	1,686	12,496	1,686	—	—
Total	M bd. ft.[1]	12,496	1,686	12,496	1,686	—	—
Piling:							
Softwood	M linear ft.	4,435	1,774	4,435	1,774	—	—
Hardwood	M linear ft.	1,108	673	1,108	673	—	—
Total	M linear ft.	5,543	2,447	5,543	2,447	—	—
Poles:							
Softwood	M pieces	104	1,248	104	1,248	—	—
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	104	1,248	104	1,248	—	—
Mine timbers (round):							
Softwood	M cu. ft.	55	55	55	55	—	—
Hardwood	M cu. ft.	495	495	495	495	—	—
Total	M cu. ft.	550	550	550	550	—	—
Posts (round and split):							
Softwood	M pieces	358	251	358	251	—	—
Hardwood	M pieces	105	74	105	74	—	—
Total	M pieces	463	325	463	325	—	—
Other:[3]							
Softwood	M cu. ft.	4,869	6,163	4,869	4,869	—	1,294
Hardwood	M cu. ft.	5,790	6,650	5,790	5,790	—	860
Total	M cu. ft.	10,659	12,813	10,659	10,659	—	2,154
All miscellaneous industrial:							
Softwood	—	—	9,491	—	8,197	—	1,294
Hardwood	—	—	9,578	—	8,718	—	860
Total	—	—	19,069	—	16,915	—	2,154
All industrial:							
Softwood	—	—	206,273	—	184,554	—	21,719
Hardwood	—	—	175,187	—	165,336	—	9,851
Total	—	—	381,460	—	349,890	—	31,570
Fuelwood:[4]							
Softwood	Std. cds.	286,164	20,580	235,183	15,992	50,981	4,588
Hardwood	Std. cds.	538,160	40,518	448,266	32,428	89,894	8,090
Total	Std. cds.	824,324	61,098	683,449	48,420	140,875	12,678
All products:							
Softwood	—	—	226,853	—	200,546	—	26,307
Hardwood	—	—	215,705	—	197,764	—	17,941
Total	—	—	442,558	—	398,310	—	44,248

[1] International ¼-inch rule.
[2] Rough wood basis (includes chips converted to equivalent standard cords).
[3] Includes particleboard wood, excelsior bolts, handle stock, etc.
[4] Includes plant byproducts used for industrial and domestic fuel.

Table 24.—*Total output of roundwood products, by product, by source, and by softwood and hardwood, Virginia, 1965*

Product and species group	All sources	Growing-stock trees [1]			Cull trees [1]	Salvable dead trees [1]	Other sources [2]
		Total	Saw-timber	Pole-timber			
	Thousand cubic feet						
Industrial products:							
Saw logs:							
Softwood	82,300	78,576	69,776	8,800	718	876	2,130
Hardwood	99,424	90,414	82,357	8,057	4,516	—	4,494
Total	181,724	168,990	152,133	16,857	5,234	876	6,624
Veneer logs and bolts:							
Softwood	217	211	209	2	—	—	6
Hardwood	7,214	6,739	6,739	—	—	—	475
Total	7,431	6,950	6,948	2	—	—	481
Pulpwood:							
Softwood	93,840	84,940	37,374	47,566	1,265	182	7,453
Hardwood	49,980	43,343	18,348	24,995	1,874	—	4,763
Total	143,820	128,283	55,722	72,561	3,139	182	12,216
Miscellaneous industrial:							
Cooperage:							
Softwood	—	—	—	—	—	—	—
Hardwood	1,686	1,686	1,686	—	—	—	—
Total	1,686	1,686	1,686	—	—	—	—
Piling:							
Softwood	1,774	1,774	1,774	—	—	—	—
Hardwood	673	673	673	—	—	—	—
Total	2,447	2,447	2,447	—	—	—	—
Poles:							
Softwood	1,248	1,248	1,248	—	—	—	—
Hardwood	—	—	—	—	—	—	—
Total	1,248	1,248	1,248	—	—	—	—
Mine timbers (round):							
Softwood	55	42	26	16	—	—	13
Hardwood	495	467	226	241	11	—	17
Total	550	509	252	257	11	—	30
Posts (round and split):							
Softwood	251	194	122	72	—	—	57
Hardwood	74	52	11	41	22	—	—
Total	325	246	133	113	22	—	57
Other:							
Softwood	4,869	4,624	3,002	1,622	64	8	173
Hardwood	5,790	5,629	1,316	4,313	161	—	—
Total	10,659	10,253	4,318	5,935	225	8	173
All miscellaneous industrial:							
Softwood	8,197	7,882	6,172	1,710	64	8	243
Hardwood	8,718	8,507	3,912	4,595	194	—	17
Total	16,915	16,389	10,084	6,305	258	8	260
All industrial:							
Softwood	184,554	171,609	113,531	58,078	2,047	1,066	9,832
Hardwood	165,336	149,003	111,356	37,647	6,584	—	9,749
Total	349,890	320,612	224,887	95,725	8,631	1,066	19,581
Fuelwood:							
Softwood	15,992	13,557	3,535	10,022	817	34	1,584
Hardwood	32,428	24,009	8,922	15,087	4,900	—	3,519
Total	48,420	37,566	12,457	25,109	5,717	34	5,103
All products:							
Softwood	200,546	185,166	117,066	68,100	2,864	1,100	11,416
Hardwood	197,764	173,012	120,278	52,734	11,484	—	13,268
Total	398,310	358,178	237,344	120,834	14,348	1,100	24,684

[1] On commercial forest land.

[2] Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, or material from noncommercial forest land or nonforest land such as fence rows and suburban areas.

Table 25.—*Annual timber cut from growing stock on commercial forest land, by product and logging residues, and by softwood and hardwood, Virginia, 1965*

Product and residues	All species	Softwood	Hardwood
	- - *Thousand cubic feet* - -		
Roundwood products:			
Saw logs	168,990	78,576	90,414
Veneer logs and bolts	6,950	211	6,739
Pulpwood	128,283	84,940	43,343
Cooperage logs and bolts	1,686	—	1,686
Piling	2,447	1,774	673
Poles	1,248	1,248	—
Mine timbers	509	42	467
Posts	246	194	52
Other	10,253	4,624	5,629
Fuelwood	37,566	13,557	24,009
All products	358,178	185,166	173,012
Logging residues:			
Harvesting	75,605	8,096	67,509
Land clearing	28,134	3,406	24,728
Cultural operations	4,200	267	3,933
Total	107,939	11,769	96,170
Timber cut	466,117	196,935	269,182

Table 26.—*Annual timber cut from live sawtimber on commercial forest land, by product and logging residues, and by softwood and hardwood, Virginia, 1965*

Product and residues	All species	Softwood	Hardwood
	- - *Thousand board feet* [1] - -		
Roundwood products:			
Saw logs	809,645	301,502	508,143
Veneer logs and bolts	48,683	903	47,780
Pulpwood	234,885	161,493	73,392
Cooperage logs and bolts	12,493	—	12,493
Piling	11,817	7,665	4,152
Poles	5,393	5,393	—
Mine timbers	1,016	112	904
Posts	571	527	44
Other	21,092	12,972	8,120
Fuelwood	50,963	15,275	35,688
All products	1,196,558	505,842	690,716
Logging residues:			
Harvesting	38,986	11,208	27,778
Land clearing	90,800	27,983	62,817
Cultural operations	10,102	—	10,102
Total	139,888	39,191	100,697
Timber cut	1,336,446	545,033	791,413

[1] International ¼-inch rule.

Table 27.—*Volume of unused wood material at primary manufacturing plants, by industrial source and type of residue, and by softwood and hardwood, Virginia, 1965*

Industrial source	Type of residues								
	All species			Softwood			Hardwood		
	Total	Coarse [1]	Fine [2]	Total	Coarse [1]	Fine [2]	Total	Coarse [1]	Fine [2]
	- - - - - - - - - - - - - - - - - - *Thousand cubic feet* - - - - - - - - - - - - - - - - - -								
Lumber industry	48,550	14,019	34,531	21,281	6,147	15,134	27,269	7,872	19,397
Veneer and plywood industry	204	113	91	6	5	1	198	108	90
Other primary industries	773	240	533	247	94	153	526	146	380
All industries	49,527	14,372	35,155	21,534	6,246	15,288	27,993	8,126	19,867

[1] Unused material, such as slabs, edgings, and veneer cores.
[2] Unused material, such as sawdust and shavings.

Table 28.—*Timber growth, available cut, and inventory of sawtimber and growing stock, by softwood and hardwood, Virginia, 1965 to 1995* [1]

Species group	1965	Projections		
		1975 (Inventory year plus 10 years)	1985 (Inventory year plus 20 years)	1995 (Inventory year plus 30 years)
	GROWING STOCK (In thousand cubic feet)			
Softwood:				
Cut	196,900	184,700	184,300	182,900
Growth	170,700	169,200	172,500	174,600
Inventory [2]	4,287,500	4,116,600	3,981,800	3,882,800
Hardwood:				
Cut	269,200	380,000	490,300	572,300
Growth	370,400	467,900	553,500	612,900
Inventory [2]	10,497,700	11,496,500	12,235,700	12,742,700
Total:				
Cut	466,100	564,700	674,600	755,200
Growth	541,100	637,100	726,000	787,500
Inventory [2]	14,785,200	15,613,100	16,217,500	16,625,500
	SAWTIMBER (In thousand board feet)			
Softwood:				
Cut	545,000	624,000	588,000	553,300
Growth	520,200	510,200	488,300	468,900
Inventory [2]	11,768,700	10,574,600	9,514,500	8,606,600
Hardwood:				
Cut	791,400	1,194,900	1,287,800	1,261,300
Growth	1,014,800	996,800	1,040,000	1,052,200
Inventory [2]	26,267,200	25,064,800	22,708,200	20,382,700
Total:				
Cut	1,336,400	1,818,900	1,875,800	1,814,600
Growth	1,535,000	1,507,000	1,528,300	1,521,100
Inventory [2]	38,035,900	35,639,400	32,222,700	28,989,300

[1] Based on the assumption that cut starting at the 1965 level will be in balance with the growth by year 2015, and that forestry progress will continue at the rate indicated by recent trends.
[2] Inventory as of January 1 of the following year.

Table 29.—*Volume of growing stock and sawtimber on commercial forest land, by stand-size classes and by softwood and hardwood, Virginia, 1966*

Stand-size class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
Sawtimber	7,891.6	2,325.5	5,566.1	26,217.8	8,330.4	17,887.4
Poletimber	5,642.6	1,558.9	4,083.7	9,321.5	2,654.5	6,667.0
Sapling and seedling	1,247.0	402.0	845.0	2,485.7	780.2	1,705.5
Nonstocked areas	4.0	1.1	2.9	10.9	3.6	7.3
All classes	14,785.2	4,287.5	10,497.7	38,035.9	11,768.7	26,267.2

Table 30.—*Basal area per acre of growing-stock and rough and rotten trees 5.0 inches d.b.h. and larger, by forest type and Survey Unit, Virginia, 1966*

Forest type	State	Coastal Plain	Southern Piedmont	Northern Piedmont	Northern Mountain	Southern Mountain
	Square feet					
White pine-hemlock:						
Growing stock	56.3	—	—	78.3	77.8	42.6
Rough and rotten trees	18.7	—	—	26.0	21.5	16.4
All trees	75.0	—	—	104.3	99.3	59.0
Loblolly-shortleaf pine:						
Growing stock	51.3	64.1	44.0	40.5	32.8	27.7
Rough and rotten trees	8.0	9.7	4.3	6.0	17.3	10.8
All trees	59.3	73.8	48.3	46.5	50.1	38.5
Oak-pine:						
Growing stock	40.7	44.8	41.0	38.4	35.9	34.0
Rough and rotten trees	12.7	13.1	6.3	7.9	23.3	16.2
All trees	53.4	57.9	47.3	46.3	59.2	50.2
Oak-hickory:						
Growing stock	41.8	42.9	42.3	45.2	41.5	38.1
Rough and rotten trees	16.9	17.3	9.4	12.9	24.7	18.4
All trees	58.7	60.2	51.7	58.1	66.2	56.5
Oak-gum-cypress:						
Growing stock	61.5	61.6	44.2	96.8	29.8	—
Rough and rotten trees	29.9	30.3	11.1	22.1	25.8	—
All trees	91.4	91.9	55.3	118.9	55.6	—
Elm-ash-cottonwood:						
Growing stock	53.7	70.8	50.6	39.1	26.1	25.7
Rough and rotten trees	17.8	25.9	14.2	12.1	7.5	33.2
All trees	71.5	96.7	64.8	51.2	33.6	58.9
Maple-beech-birch:						
Growing stock	48.0	—	—	41.7	81.2	47.1
Rough and rotten trees	25.1	—	—	23.5	35.8	24.5
All trees	73.1	—	—	65.2	117.0	71.6
All types:						
Growing stock	43.9	50.7	42.7	43.3	40.5	37.6
Rough and rotten trees	14.9	15.1	7.6	11.0	24.1	18.0
All trees	58.8	65.8	50.3	54.3	64.6	55.6

Table 31.—*Number of growing-stock and rough and rotten trees 1.0-4.9 inches d.b.h. per acre, by forest type and Survey Unit, Virginia, 1966*

Forest type	State	Coastal Plain	Southern Piedmont	Northern Piedmont	Northern Mountain	Southern Mountain
			Number of trees per acre			
White pine-hemlock:						
Growing stock	317	—	—	27	281	354
Rough and rotten trees	44	—	—	5	56	33
All trees	361	—	—	32	337	387
Loblolly-shortleaf pine:						
Growing stock	685	708	779	636	467	581
Rough and rotten trees	104	88	86	108	266	159
All trees	789	796	865	744	733	740
Oak-pine:						
Growing stock	315	401	387	277	182	219
Rough and rotten trees	351	366	306	272	393	358
All trees	666	767	693	549	575	577
Oak-hickory:						
Growing stock	232	260	265	196	163	231
Rough and rotten trees	349	334	327	276	391	407
All trees	581	594	592	472	554	638
Oak-gum-cypress:						
Growing stock	319	361	213	379	101	—
Rough and rotten trees	352	345	172	470	218	—
All trees	671	706	385	849	319	—
Elm-ash-cottonwood:						
Growing stock	149	335	108	33	73	213
Rough and rotten trees	225	429	133	46	174	375
All trees	374	764	241	79	247	588
Maple-beech-birch:						
Growing stock	181	—	—	237	214	124
Rough and rotten trees	273	—	—	334	511	217
All trees	454	—	—	571	725	341
All types:						
Growing stock	305	366	383	276	187	246
Rough and rotten trees	327	331	291	260	379	378
All trees	632	697	674	536	566	624

Table 32.—*Average net volume per acre on commercial forest land, by area description and species group, Virginia, 1966*

Area description	Softwood		Hardwood		Total	
	Cubic feet	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*
Pine types: [1]						
Site classes 1 and 2						
Growing stock	1,160.6	2,919	191.2	369	1,351.8	3,288
Rough and rotten trees	88.0	—	74.1	—	162.1	—
Total	1,248.6	2,919	265.3	369	1,513.9	3,288
Site class 3						
Growing stock	1,413.7	4,383	239.4	604	1,653.1	4,987
Rough and rotten trees	56.5	—	77.5	—	134.0	—
Total	1,470.2	4,383	316.9	604	1,787.1	4,987
Site class 4						
Growing stock	796.9	2,139	171.0	359	967.9	2,498
Rough and rotten trees	55.4	—	54.7	—	110.1	—
Total	852.3	2,139	225.7	359	1,078.0	2,498
Site class 5						
Growing stock	505.7	1,037	95.1	208	600.8	1,245
Rough and rotten trees	65.8	—	61.5	—	127.3	—
Total	571.5	1,037	156.6	208	728.1	1,245
Oak-pine type:						
Site classes 1 and 2						
Growing stock	487.3	1,418	460.7	924	948.0	2,342
Rough and rotten trees	47.6	—	186.8	—	234.4	—
Total	534.9	1,418	647.5	924	1,182.4	2,342
Site class 3						
Growing stock	625.4	1,967	592.5	1,522	1,217.9	3,489
Rough and rotten trees	23.7	—	171.4	—	195.1	—
Total	649.1	1,967	763.9	1,522	1,413.0	3,489
Site class 4						
Growing stock	414.1	1,160	445.4	948	859.5	2,108
Rough and rotten trees	27.1	—	136.9	—	164.0	—
Total	441.2	1,160	582.3	948	1,023.5	2,108
Site class 5						
Growing stock	272.2	722	303.5	625	575.7	1,347
Rough and rotten trees	59.2	—	157.6	—	216.8	—
Total	331.4	722	461.1	625	792.5	1,347
Oak-hickory type: [2]						
Site classes 1 and 2						
Growing stock	176.0	628	1,079.8	2,987	1,255.8	3,615
Rough and rotten trees	9.0	—	233.2	—	242.2	—
Total	185.0	628	1,313.0	2,987	1,498.0	3,615
Site class 3						
Growing stock	107.2	363	1,096.1	3,147	1,203.3	3,510
Rough and rotten trees	7.6	—	264.0	—	271.6	—
Total	114.8	363	1,360.1	3,147	1,474.9	3,510
Oak-hickory type: [2]						
Site class 4						
Growing stock	76.1	238	914.0	2,374	990.1	2,612
Rough and rotten trees	6.2	—	254.6	—	260.8	—
Total	82.3	238	1,168.6	2,374	1,250.9	2,612
Site class 5						
Growing stock	63.8	191	689.9	1,649	753.7	1,840
Rough and rotten trees	9.9	—	274.1	—	284.0	—
Total	73.7	191	964.0	1,649	1,037.7	1,840
Oak-gum-cypress: [3]						
Site classes 1 and 2						
Growing stock	—	—	1,886.5	4,618	1,886.5	4,618
Rough and rotten trees	—	—	310.0	—	310.0	—
Total	—	—	2,196.5	4,618	2,196.5	4,618
Site class 3						
Growing stock	160.8	679	1,656.2	4,375	1,817.0	5,054
Rough and rotten trees	3.2	—	364.4	—	367.6	—
Total	164.0	679	2,020.6	4,375	2,184.6	5,054
Site class 4						
Growing stock	209.9	844	1,291.5	3,399	1,501.4	4,243
Rough and rotten trees	15.9	—	413.4	—	429.3	—
Total	225.8	844	1,704.9	3,399	1,930.7	4,243
Site class 5						
Growing stock	205.6	850	1,156.2	2,974	1,361.8	3,824
Rough and rotten trees	26.3	—	508.1	—	534.4	—
Total	231.9	850	1,664.3	2,974	1,896.2	3,824
All types:						
Site classes 1 and 2						
Growing stock	598.3	1,622	631.8	1,599	1,230.1	3,221
Rough and rotten trees	46.1	—	166.7	—	212.8	—
Total	644.4	1,622	798.5	1,599	1,442.9	3,221
Site class 3						
Growing stock	588.6	1,853	784.5	2,197	1,373.1	4,050
Rough and rotten trees	24.7	—	197.9	—	222.6	—
Total	613.3	1,853	982.4	2,197	1,595.7	4,050
Site class 4						
Growing stock	275.6	774	698.7	1,764	974.3	2,538
Rough and rotten trees	19.5	—	199.2	—	218.7	—
Total	295.1	774	897.9	1,764	1,193.0	2,538
Site class 5						
Growing stock	159.5	405	563.4	1,335	722.9	1,740
Rough and rotten trees	25.4	—	234.0	—	259.4	—
Total	184.9	405	797.4	1,335	982.3	1,740

[1] Includes all softwood types.
[2] Includes maple-beech-birch types.
[3] Includes elm-ash-cottonwood types.

Table 33.—*Average net volume and growth per acre on commercial forest land, by ownership, tree class, and species group, Virginia, 1966*

Ownership and tree class	Net volume per acre						Net growth per acre					
	Softwood		Hardwood		Total		Softwood		Hardwood		Total	
	Cubic feet	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*
National Forest:												
Growing stock	145.3	512	748.7	1,992	894.0	2,504	4.2	15	26.0	66	30.2	81
Rough and rotten trees	34.7	—	479.4	—	514.1	—	1.3	—	19.3	—	20.6	—
Total	180.0	512	1,228.1	1,992	1,408.1	2,504	5.5	15	45.3	66	50.8	81
Other public:												
Growing stock	398.4	1,109	738.2	1,788	1,136.6	2,897	14.0	44	26.0	75	40.0	119
Rough and rotten trees	24.5	—	201.2	—	225.7	—	1.1	—	8.2	—	9.3	—
Total	422.9	1,109	939.4	1,788	1,362.3	2,897	15.1	44	34.2	75	49.3	119
Forest industry:												
Growing stock	462.6	1,386	542.4	1,275	1,005.0	2,661	19.6	66	20.5	56	40.1	122
Rough and rotten trees	28.7	—	136.0	—	164.7	—	1.6	—	6.0	—	7.6	—
Total	491.3	1,386	678.4	1,275	1,169.7	2,661	21.2	66	26.5	56	47.7	122
Farmer-owned:												
Growing stock	263.8	689	648.7	1,627	912.5	2,316	11.2	35	22.0	63	33.2	98
Rough and rotten trees	19.4	—	173.5	—	192.9	—	1.1	—	6.8	—	7.9	—
Total	283.2	689	822.2	1,627	1,105.4	2,316	12.3	35	28.8	63	41.1	98
Misc. private:												
Growing stock	243.5	654	692.5	1,730	936.0	2,384	9.9	31	23.8	67	33.7	98
Rough and rotten trees	18.4	—	189.3	—	207.7	—	1.0	—	7.6	—	8.6	—
Total	261.9	654	881.8	1,730	1,143.7	2,384	10.9	31	31.4	67	42.3	98
All ownerships:												
Growing stock	271.2	744	664.0	1,662	935.2	2,406	10.9	35	23.0	64	33.9	99
Rough and rotten trees	21.3	—	199.5	—	220.8	—	1.1	—	8.0	—	9.1	—
Total	292.5	744	863.5	1,662	1,156.0	2,406	12.0	35	31.0	64	43.0	99

Table 34.—*Land area, by class and major forest type, Virginia, 1940, 1957, and 1966*

Land class and forest type	1940	1957	1966	Change 1957-1966
	Thousand acres			
Commercial forest land:				
Pine and oak-pine type	6,230.4	5,909.4	5,519.2	— 390.2
Hardwood type	8,181.6	9,540.5	10,290.1	+ 749.6
Total	14,412.0	15,449.9	15,809.3	+ 359.4
Noncommercial forest land:				
Productive-reserved	235.9	259.4	313.5	+ 54.1
Unproductive	184.4	404.2	216.2	— 188.0
Total	420.3	663.6	529.7	— 133.9
Nonforest land:				
Cropland	6,334.8	4,650.0	3,604.9	—1,045.1
Pasture and range	3,424.3	3,506.2	3,588.3	+ 82.1
Other	835.0	1,137.2	1,833.6	+ 696.4
Total	10,594.1	9,293.4	9,026.8	— 266.6
All land [1]	25,426.4	25,406.9	25,365.8	— 41.1

[1] Excludes all water areas.

Table 35.—*Volume* [1] *of sawtimber, growing stock, and all timber, by species group and diameter class, Virginia, 1940, 1957, and 1966*

Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 & larger
			SAWTIMBER (In million board feet, International 1/4-inch rule)								
Softwood	1940	12,089.5	—	—	2,994.5	3,070.7	2,279.7	1,487.0	919.7	559.1	778.8
	1957	11,682.7	—	—	3,087.8	3,203.2	2,221.9	1,326.2	765.7	496.6	581.3
	1966	11,768.7	—	—	3,026.7	2,983.2	2,282.5	1,475.8	945.5	523.8	531.2
Hardwood	1940	19,524.4	—	—	—	3,761.8	3,828.3	3,156.7	2,636.4	1,984.1	4,157.1
	1957	24,045.8	—	—	—	5,065.7	5,445.3	4,195.2	3,294.7	2,129.6	3,915.3
	1966	26,267.2	—	—	—	5,526.9	5,860.8	4,690.9	3,493.9	2,321.1	4,373.6
			GROWING STOCK (In million cubic feet)								
Softwood	1940	4,406.3	635.4	872.4	875.6	739.2	506.4	316.4	190.2	114.0	156.7
	1957	4,441.5	672.1	947.9	901.5	770.2	492.1	281.7	158.2	101.4	116.4
	1966	4,287.5	579.0	878.6	884.5	718.0	505.8	312.7	195.4	106.6	106.9
Hardwood	1940	7,404.5	676.8	893.6	1,049.1	1,110.5	955.3	747.0	599.9	450.6	921.7
	1957	9,536.7	839.4	1,280.0	1,470.6	1,492.7	1,358.2	992.7	750.6	484.0	868.5
	1966	10,497.7	1,016.1	1,413.9	1,571.3	1,629.1	1,462.1	1,110.3	795.7	527.7	971.5
			ALL TIMBER (In million cubic feet)								
Softwood	1940	4,729.1	714.2	979.0	940.3	772.1	519.4	324.1	193.3	116.6	170.1
	1957	4,790.9	753.1	1,070.9	973.7	807.5	505.4	288.5	160.8	103.9	127.1
	1966	4,624.4	652.5	993.3	959.6	754.2	519.9	320.1	198.9	109.2	116.7
Hardwood	1940	9,607.6	991.6	1,208.9	1,386.6	1,386.5	1,153.6	906.9	727.1	562.2	1,284.2
	1957	12,356.6	1,231.7	1,733.7	1,951.2	1,867.0	1,640.4	1,203.4	913.0	604.2	1,212.0
	1966	13,651.3	1,494.6	1,920.5	2,087.4	2,043.1	1,766.6	1,348.9	966.2	661.2	1,362.8

[1] In order to provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in previous surveys.

Table 36.—*Volume of all timber, by species group and Survey Unit, Virginia, 1940, 1957, and 1966*

Species group and Survey Unit	1940	1957	Change 1940-1957	1966	Change 1957-1966
	Million cu. ft.	*Million cu. ft.*	*Percent*	*Million cu. ft.*	*Percent*
Softwood:					
Coastal Plain	2,383.1	2,372.9	— 0.4	2,186.6	— 7.9
Southern Piedmont	1,292.2	1,243.5	— 3.8	1,158.1	— 6.9
Northern Piedmont	562.6	529.9	— 5.8	540.8	+ 2.1
Northern Mountain	289.6	398.1	+37.5	443.4	+11.4
Southern Mountain	201.6	246.5	+22.3	295.5	+19.9
All units	4,729.1	4,790.9	+ 1.3	4,624.4	— 3.5
Hardwood:					
Coastal Plain	2,893.8	3,342.0	+15.5	3,454.7	+ 3.4
Southern Piedmont	1,926.8	2,451.4	+27.2	2,617.2	+ 6.8
Northern Piedmont	1,494.7	1,963.3	+31.4	2,127.3	+ 8.4
Northern Mountain	1,529.0	2,217.7	+45.0	2,600.7	+17.3
Southern Mountain	1,763.3	2,382.2	+35.1	2,851.4	+19.7
All units	9,607.6	12,356.6	+28.6	13,651.3	+10.5

County Tables

The tables that follow are intended for use in compiling forest resource estimates for groups of counties. Because the sampling procedure used by the Forest Survey in Virginia was intended primarily to furnish inventory data for the State as a whole, individual county estimates have limited and variable accuracy. As totals are broken down by various subdivisions, the sampling error increases and is greatest for the smallest items. The order of this increase is suggested in the tabulation on page 21. For example, table 41 of this report shows that net growth of growing stock in Southampton County totals 13.1 million cubic feet with 6.7 million cubic feet in softwood. For this particular county, the total growth estimate is subject to a sampling error of ±11.6 percent and the softwood estimate is subject to an error of ±16.2 percent.

Table 37.—*Land area and commercial forest, by county,*[1] *Virginia, 1966*

County	All land	Commercial forest		County	All land	Commercial forest	
	Thousand acres	*Thousand acres*	*Per-cent*		*Thousand acres*	*Thousand acres*	*Per-cent*
Accomack	300.8	97.9	32.5	Lancaster	90.9	46.0	50.6
Albemarle	480.6	267.2	55.6	Lee	280.3	162.2	57.9
Alleghany	289.3	227.2	78.5	Loudoun	330.9	99.1	29.9
Amelia	234.2	170.1	72.6	Louisa	330.9	232.5	70.3
Amherst	298.9	209.4	70.1	Lunenburg	283.5	202.9	71.6
Appomattox	219.5	159.7	72.8	Madison	209.3	91.9	43.9
Arlington	20.5	—	—	Mathews	55.7	29.7	53.3
Augusta	641.3	294.4	45.9	Mecklenburg	396.7	247.8	62.5
Bath	345.6	273.7	79.2	Middlesex	84.5	54.0	63.9
Bedford	488.1	305.6	62.6	Montgomery	256.0	159.4	62.3
Bland	236.2	182.0	77.1	Nansemond	255.5	168.0	65.8
Botetourt	350.7	254.2	72.5	Nelson	299.5	226.2	75.5
Brunswick	370.1	285.6	77.2	New Kent	135.7	107.9	79.5
Buchanan	325.1	281.7	86.7	Norfolk	263.7	138.7	52.6
Buckingham	368.7	281.9	76.5	Northampton	144.6	31.4	21.7
Campbell	352.7	226.7	64.3	Northumberland	128.0	77.5	60.5
Caroline	348.2	270.2	77.6	Nottoway	197.1	132.3	67.1
Carroll	317.5	173.0	54.5	Orange	227.2	130.4	57.4
Charles City	117.8	86.8	73.7	Page	202.3	85.7	42.4
Charlotte	298.9	202.6	67.8	Patrick	299.7	230.4	76.9
Chesterfield	306.4	222.0	72.5	Pittsylvania	652.7	396.1	60.7
Clarke	111.4	32.8	29.4	Powhatan	171.5	123.9	72.2
Craig	215.0	165.2	76.8	Prince Edward	228.5	153.7	67.3
Culpeper	249.0	110.1	44.2	Prince George	185.0	126.9	68.6
Cumberland	186.9	128.3	68.6	Prince William	220.8	108.2	49.0
Dickenson	214.4	177.1	82.6	Princess Anne	163.2	48.3	29.6
Dinwiddie	329.0	246.0	74.8	Pulaski	209.3	111.0	53.0
Elizabeth City	36.5	3.4	9.3	Rappahannock	170.9	65.9	38.6
Essex	160.0	100.4	62.8	Richmond	122.9	80.8	65.7
Fairfax	264.9	111.4	42.1	Roanoke	193.9	115.1	59.4
Fauquier	422.4	176.1	41.7	Rockbridge	388.5	238.4	61.4
Floyd	245.1	129.5	52.8	Rockingham	557.4	239.2	42.9
Fluvanna	180.4	122.6	68.0	Russell	309.1	158.6	51.3
Franklin	459.5	299.5	65.2	Scott	345.0	218.3	63.3
Frederick	279.0	150.2	53.8	Shenandoah	324.5	168.4	51.9
Giles	232.3	164.9	71.0	Smyth	278.4	169.4	60.8
Gloucester	144.0	98.4	68.3	Southampton	388.5	256.1	65.9
Goochland	184.9	128.5	69.5	Spotsylvania	266.8	193.4	72.5
Grayson	291.0	160.1	55.0	Stafford	173.5	126.6	73.0
Greene	97.9	49.4	50.5	Surry	179.2	135.7	75.7
Greensville	192.6	138.1	71.7	Sussex	317.4	247.7	78.0
Halifax	513.3	341.0	66.4	Tazewell	334.1	199.5	59.7
Hanover	301.4	201.6	66.9	Warren	140.2	70.6	50.4
Henrico	162.7	87.4	53.7	Warwick	48.0	19.2	40.0
Henry	252.0	173.0	68.7	Washington	372.3	181.9	48.9
Highland	266.2	188.3	70.7	Westmoreland	151.0	86.4	57.2
Isle of Wight	204.1	118.9	58.3	Wise	265.6	210.0	79.1
James City	96.6	68.8	71.2	Wythe	294.4	152.2	51.7
King and Queen	203.5	158.1	77.7	York	78.7	43.7	55.5
King George	113.9	79.8	70.1				
King William	177.9	129.3	72.7	Total	25,502.2	15,809.3	62.0

[1] Includes independent cities.

Table 38.—*Commercial forest land, by county and ownership, Virginia, 1966*

County	All ownerships	National Forest	Other public	Forest industry	Farmer	Misc. private
	Thousand acres					
Accomack	97.9	—	1.0	11.2	67.0	18.7
Albemarle	267.2	—	2.1	22.7	131.9	110.5
Alleghany	227.2	105.5	2.2	5.3	51.6	62.6
Amelia	170.1	—	—	38.9	110.0	21.2
Amherst	209.4	43.0	0.4	9.5	115.0	41.5
Appomattox	159.7	—	9.0	34.9	69.5	46.3
Arlington	—	—	—	—	—	—
Augusta	294.4	147.8	11.0	—	81.4	54.2
Bath	273.7	130.2	15.1	—	77.0	51.4
Bedford	305.6	8.9	1.5	16.7	212.7	65.8
Bland	182.0	19.4	0.5	3.2	61.1	97.8
Botetourt	254.2	58.0	6.9	11.3	72.0	106.0
Brunswick	285.6	—	9.1	52.6	143.9	80.0
Buchanan	281.7	—	0.1	45.5	17.6	218.5
Buckingham	281.9	2.7	9.8	69.9	120.5	79.0
Campbell	226.7	—	—	26.3	112.7	87.7
Caroline	270.2	—	60.1	22.5	93.8	93.8
Carroll	173.0	3.7	0.9	3.9	91.0	73.5
Charles City	86.8	—	(1)	34.9	17.3	34.6
Charlotte	202.6	—	1.9	48.2	90.8	61.7
Chesterfield	222.0	—	8.8	44.3	49.5	119.4
Clarke	32.8	—	0.7	1.8	16.8	13.5
Craig	165.2	101.0	0.5	1.0	37.6	25.1
Culpeper	110.1	—	—	8.3	59.1	42.7
Cumberland	128.3	—	15.5	24.6	58.8	29.4
Dickenson	177.1	8.5	2.6	58.2	19.3	88.5
Dinwiddie	246.0	—	6.6	60.2	88.1	91.1
Elizabeth City	3.4	—	—	—	—	3.4
Essex	100.4	—	0.4	6.9	72.4	20.7
Fairfax	111.4	—	8.5	—	16.1	86.8
Fauquier	176.1	—	4.4	5.5	109.6	56.6
Floyd	129.5	—	(1)	—	105.2	24.3
Fluvanna	122.6	—	—	21.9	44.3	56.4
Franklin	299.5	—	2.7	10.4	153.9	132.5
Frederick	150.2	4.0	—	—	83.0	63.2
Giles	164.9	48.6	1.2	—	39.7	75.4
Gloucester	98.4	—	—	16.3	55.7	26.4
Goochland	128.5	—	(1)	13.3	49.9	65.3
Grayson	160.1	11.9	0.1	0.4	103.8	43.9
Greene	49.4	—	1.2	1.2	36.9	10.1
Greensville	138.1	—	0.4	35.2	79.7	22.8
Halifax	341.0	—	9.7	13.4	248.5	69.4
Hanover	201.6	—	1.6	14.3	105.3	80.4
Henrico	87.4	—	0.7	0.9	42.9	42.9
Henry	173.0	—	1.5	9.6	59.7	102.2
Highland	188.3	46.2	17.6	4.4	42.4	77.7
Isle of Wight	118.9	—	0.8	28.2	67.4	22.5
James City	68.8	—	2.2	4.3	15.6	46.7
King and Queen	158.1	—	0.4	39.8	63.7	54.2
King George	79.8	—	1.1	1.6	44.5	32.6
King William	129.3	—	0.5	22.9	56.3	49.6
Lancaster	46.0	—	—	6.0	21.5	18.5
Lee	162.2	9.4	0.1	2.1	83.7	66.9
Loudoun	99.1	—	6.9	—	66.4	25.8
Louisa	232.5	—	0.1	22.4	96.9	113.1
Lunenburg	202.9	—	0.1	41.8	77.0	84.0
Madison	91.9	—	7.0	0.9	46.2	37.8
Mathews	29.7	—	—	4.9	15.5	9.3
Mecklenburg	247.8	—	25.7	17.6	147.2	57.3
Middlesex	54.0	—	(1)	1.9	37.6	14.5
Montgomery	159.4	17.3	2.7	—	35.8	103.6
Nansemond	168.0	—	2.0	59.1	67.2	39.7
Nelson	226.2	9.8	1.1	25.9	91.3	98.1
New Kent	107.9	—	0.3	35.6	20.6	51.4
Norfolk	138.7	—	3.9	20.1	35.1	79.6
Northampton	31.4	—	(1)	0.4	28.4	2.6
Northumberland	77.5	—	—	2.1	59.0	16.4
Nottoway	132.3	—	14.3	22.8	79.3	15.9
Orange	130.4	—	0.3	12.8	73.7	43.6
Page	85.7	16.7	—	—	36.5	32.5
Patrick	230.4	—	10.9	13.5	131.8	74.2
Pittsylvania	396.1	—	0.9	11.9	294.0	89.3
Powhatan	123.9	—	3.1	21.2	55.8	43.8
Prince Edward	153.7	—	6.8	21.5	80.4	45.0
Prince George	126.9	—	3.3	41.4	41.1	41.1
Prince William	108.2	—	22.4	—	41.3	44.5
Princess Anne	48.3	—	3.4	2.6	19.9	22.4
Pulaski	111.0	18.0	3.6	—	31.3	58.1
Rappahannock	65.9	—	—	0.4	49.1	16.4
Richmond	80.8	—	(1)	9.7	47.4	23.7
Roanoke	115.1	0.9	9.5	—	57.7	47.0
Rockbridge	238.4	48.9	27.7	5.5	87.7	68.6
Rockingham	239.2	94.7	3.4	—	70.5	70.6
Russell	158.6	—	7.3	18.5	91.3	41.5
Scott	218.3	30.9	—	1.5	123.9	62.0
Shenandoah	168.4	57.7	0.1	—	46.4	64.2
Smyth	169.4	57.8	8.6	—	41.2	61.8
Southampton	256.1	—	1.8	51.0	150.7	52.6
Spotsylvania	193.4	—	—	36.2	52.4	104.8
Stafford	126.6	—	29.3	2.7	28.4	66.2
Surry	135.7	—	1.1	34.9	68.4	31.3
Sussex	247.7	—	0.2	89.7	109.9	47.9
Tazewell	199.5	5.2	5.0	0.3	70.4	118.6
Warren	70.6	4.9	1.4	—	37.8	26.5
Warwick	19.2	—	4.4	—	—	14.8
Washington	181.9	17.2	6.4	1.5	87.6	69.2
Westmoreland	86.4	—	—	3.3	71.6	11.5
Wise	210.0	26.9	3.6	12.2	17.2	150.1
Wythe	152.2	47.1	1.9	—	65.0	38.2
York	43.7	—	17.2	—	6.6	19.9
Total	15,809.3	1,202.8	469.1	1,562.3	6,958.2	5,616.9

[1] Less than 50 acres.

Table 39.—*Volume of sawtimber and growing stock, by county and species group, Virginia, 1966*

County	Sawtimber					Growing stock				
	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					*Thousand cords*				
Accomack	307.0	257.3	—	31.8	17.9	1,434	1,023	—	239	172
Albemarle	664.1	76.8	14.4	182.9	390.0	3,342	523	56	718	2,045
Alleghany	331.7	54.2	21.8	33.6	222.1	1,958	286	70	169	1,433
Amelia	529.4	199.9	—	151.1	178.4	2,986	1,071	9	785	1,121
Amherst	279.0	27.0	26.0	60.6	165.4	1,724	248	79	356	1,041
Appomattox	310.2	91.4	0.9	50.9	167.0	1,870	608	5	257	1,000
Arlington	—	—	—	—	—	—	—	—	—	—
Augusta	672.0	117.6	24.4	39.0	491.0	3,435	555	74	165	2,641
Bath	585.0	65.6	21.0	44.2	454.2	3,307	309	79	309	2,610
Bedford	588.0	65.3	7.4	165.0	350.3	3,421	867	27	923	1,604
Bland	300.6	24.9	24.9	38.8	212.0	1,645	114	104	277	1,150
Botetourt	568.9	72.2	35.9	141.7	319.1	2,626	397	110	519	1,600
Brunswick	747.0	439.8	1.5	162.8	142.9	3,887	1,994	11	883	999
Buchanan	739.9	0.6	37.7	175.5	526.1	3,425	2	105	1,012	2,306
Buckingham	426.4	100.9	0.7	41.6	283.2	3,307	759	8	434	2,106
Campbell	412.5	101.8	—	53.2	257.5	2,324	763	2	288	1,271
Caroline	664.9	275.7	—	160.1	229.1	3,368	1,327	1	775	1,265
Carroll	260.9	13.0	61.6	39.9	146.4	1,742	120	255	316	1,051
Charles City	412.1	254.7	1.4	44.7	111.3	1,785	853	3	371	558
Charlotte	349.9	109.7	0.8	88.5	150.9	2,532	990	23	547	972
Chesterfield	601.7	256.1	2.1	122.0	221.5	2,933	1,016	8	651	1,258
Clarke	62.7	—	—	18.1	44.6	338	12	—	92	234
Craig	271.1	94.4	10.0	16.4	150.3	1,435	400	38	79	918
Culpeper	235.8	53.6	1.4	31.1	149.7	1,307	329	14	204	760
Cumberland	240.8	43.6	0.6	45.0	151.6	1,549	566	10	297	676
Dickenson	486.7	10.1	19.4	98.3	358.9	2,220	34	49	557	1,580
Dinwiddie	842.8	474.5	0.7	142.7	224.9	3,942	1,819	14	744	1,365
Elizabeth City	2.3	0.8	—	—	1.5	18	4	—	—	14
Essex	228.3	125.7	0.5	41.6	60.5	1,058	479	2	206	371
Fairfax	505.3	52.0	—	115.1	338.2	2,112	354	—	450	1,308
Fauquier	355.6	84.7	1.3	72.3	197.3	2,130	605	18	365	1,142
Floyd	260.7	2.6	96.5	32.3	129.3	1,332	52	333	249	698
Fluvanna	189.0	68.7	—	42.4	77.9	1,376	539	14	243	580
Franklin	546.2	108.1	59.1	116.7	262.3	3,348	867	226	823	1,432
Frederick	317.6	10.6	5.7	14.8	286.5	1,729	132	36	109	1,452
Giles	349.6	13.4	18.9	68.2	249.1	1,677	83	42	391	1,161
Gloucester	302.8	167.4	1.0	74.0	60.4	1,184	578	3	325	278
Goochland	200.9	21.0	—	65.8	114.1	1,350	333	9	340	668
Grayson	265.3	4.6	21.5	41.0	198.2	1,513	18	120	263	1,112
Greene	120.1	2.4	—	52.7	65.0	651	66	—	253	332
Greensville	544.6	230.6	1.2	159.7	153.1	2,422	915	5	733	769
Halifax	660.4	298.6	2.0	141.6	218.2	4,341	1,904	53	983	1,401
Hanover	543.2	207.4	—	118.8	217.0	2,818	1,176	10	623	1,009
Henrico	220.6	78.5	—	47.3	94.8	1,152	336	—	229	587
Henry	291.4	131.9	0.7	45.1	113.7	2,280	1,220	2	385	673
Highland	664.5	30.1	88.3	84.5	461.6	3,079	100	261	521	2,197
Isle of Wight	564.6	313.8	4.7	115.3	130.8	2,228	1,107	20	542	559
James City	215.3	88.8	0.9	25.0	100.6	1,007	358	10	147	492
King and Queen	453.0	238.7	6.7	57.8	149.8	2,171	1,153	21	297	700
King George	178.3	26.0	2.2	43.7	106.4	983	219	13	299	452
King William	386.5	178.6	1.3	80.8	125.8	1,698	763	8	318	609

Table 39.—*Volume of sawtimber and growing stock, by county and species group, Virginia, 1966* (Continued)

County	Sawtimber					Growing stock				
	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood	All species	Yellow pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					*Thousand cords*				
Lancaster	60.0	41.8	—	7.3	10.9	360	198	—	47	115
Lee	368.4	7.5	17.5	86.5	256.9	1,861	43	101	432	1,285
Loudoun	405.8	15.3	—	72.3	318.2	1,692	107	5	251	1,329
Louisa	365.7	106.1	2.1	64.4	193.1	2,712	812	28	501	1,371
Lunenburg	437.1	142.2	0.7	120.2	174.0	2,948	912	24	791	1,221
Madison	227.8	19.5	5.1	53.6	149.6	1,222	215	20	254	733
Mathews	71.0	36.6	—	10.2	24.2	324	163	—	53	108
Mecklenburg	371.0	135.1	1.6	89.1	145.2	2,860	930	17	792	1,121
Middlesex	126.3	77.6	—	31.0	17.7	618	298	—	177	143
Montgomery	185.1	24.1	23.3	31.1	106.6	1,360	248	150	178	784
Nansemond	835.4	359.2	10.6	336.5	129.1	3,384	1,090	33	1,704	557
Nelson	448.2	18.9	27.1	125.0	277.2	2,400	292	83	623	1,402
New Kent	413.2	131.7	—	92.0	189.5	1,899	645	—	422	832
Norfolk	494.5	228.3	15.5	181.9	68.8	2,111	685	32	1,094	300
Northampton	54.8	40.5	—	5.5	8.8	289	176	1	56	56
Northumberland	191.9	88.1	—	37.0	66.8	867	396	—	145	326
Nottoway	322.6	132.0	—	86.0	104.6	1,796	798	4	428	566
Orange	285.2	39.9	3.0	59.1	183.2	1,657	376	41	277	963
Page	202.2	44.2	3.5	13.7	140.8	1,088	275	9	49	755
Patrick	356.8	42.0	14.7	68.0	232.1	2,328	389	62	625	1,252
Pittsylvania	786.4	225.5	3.3	197.6	360.0	4,855	1,741	26	1,136	1,952
Powhatan	263.7	66.8	0.8	62.1	134.0	1,553	401	17	359	776
Prince Edward	231.6	54.5	0.6	74.0	102.5	1,811	563	5	464	779
Prince George	443.0	214.0	13.9	119.1	96.0	2,052	955	33	517	547
Prince William	337.2	57.6	—	42.6	237.0	1,682	300	8	199	1,175
Princess Anne	140.8	35.1	—	68.0	37.7	664	112	—	341	211
Pulaski	134.2	51.8	8.6	8.3	65.5	799	225	27	66	481
Rappahannock	166.2	3.6	2.6	67.7	92.3	866	41	9	312	504
Richmond	206.2	61.8	—	65.5	78.9	1,021	306	—	353	362
Roanoke	129.1	38.4	13.0	18.1	59.6	760	196	50	117	397
Rockbridge	578.6	52.9	41.2	72.8	411.7	2,791	285	152	319	2,035
Rockingham	676.9	41.7	67.8	75.1	492.3	3,179	211	255	277	2,436
Russell	309.2	0.9	10.4	98.7	199.2	1,758	3	32	536	1,187
Scott	459.6	10.6	9.8	123.5	315.7	2,034	82	41	540	1,371
Shenandoah	374.5	60.8	11.1	17.6	285.0	2,157	426	37	112	1,582
Smyth	431.2	40.8	26.7	50.7	313.0	2,289	205	87	334	1,663
Southampton	1,318.3	590.4	108.3	366.9	252.7	5,021	2,037	289	1,608	1,087
Spotsylvania	317.5	126.6	—	58.1	132.8	2,443	1,076	8	494	865
Stafford	375.7	70.2	—	89.9	215.6	2,136	608	5	466	1,057
Surry	576.2	304.5	13.9	118.2	139.6	2,530	1,255	42	542	691
Sussex	1,125.4	637.4	28.1	220.3	239.6	4,755	2,435	54	1,084	1,182
Tazewell	306.1	5.2	8.6	60.9	231.4	1,643	15	21	435	1,172
Warren	106.6	16.0	—	23.3	67.3	823	119	—	122	582
Warwick	101.2	63.1	—	18.2	19.9	373	207	—	76	90
Washington	362.4	40.7	10.6	82.5	228.6	2,198	216	31	605	1,346
Westmoreland	162.6	64.4	—	34.8	63.4	834	304	—	185	345
Wise	540.3	4.5	17.3	146.4	372.1	2,623	43	32	915	1,633
Wythe	348.7	48.2	26.1	23.1	251.3	1,911	250	88	133	1,440
York	246.3	108.6	1.3	54.6	81.8	985	383	5	243	354
Total	38,035.9	10,592.9	1,175.8	7,865.0	18,402.2	199,821	54,394	4,324	42,850	98,253

Table 40.—*Annual cut of growing stock and sawtimber, by county, Virginia, 1965*

County	Growing stock			Sawtimber			County	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood		All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million cubic feet			*Million board feet*				*Million cubic feet*			*Million board feet*		
Accomack	1.4	0.8	0.6	4.1	2.9	1.2	Lancaster	4.7	2.6	2.1	14.5	8.3	6.2
Albemarle	4.7	1.6	3.1	8.8	4.2	4.6	Lee	0.3	—	0.3	0.8	—	0.8
Alleghany	3.3	0.4	2.9	8.9	1.6	7.3	Loudoun	3.0	0.7	2.3	8.1	1.6	6.5
Amelia	3.4	2.2	1.2	9.0	5.3	3.7	Louisa	6.9	1.7	5.2	12.4	4.5	7.9
Amherst	3.4	1.1	2.3	6.6	1.3	5.3	Lunenburg	5.1	2.4	2.7	14.6	6.7	7.9
Appomattox	2.3	1.0	1.3	5.5	1.0	4.5	Madison	1.7	0.6	1.1	5.3	3.1	2.2
Arlington	—	—	—	—	—	—	Mathews	0.6	—	0.6	1.4	—	1.4
Augusta	5.2	0.9	4.3	10.5	1.0	9.5	Mecklenburg	9.7	4.3	5.4	23.8	9.0	14.8
Bath	4.5	0.2	4.3	13.8	0.7	13.1	Middlesex	3.3	2.6	0.7	12.0	8.9	3.1
Bedford	8.8	3.8	5.0	18.4	5.1	13.3	Montgomery	1.6	—	1.6	4.4	—	4.4
Bland	1.2	0.2	1.0	2.8	1.0	1.8	Nansemond	5.7	2.2	3.5	26.8	10.7	16.1
Botetourt	4.4	0.6	3.8	15.7	1.6	14.1	Nelson	2.5	0.2	2.3	7.1	0.7	6.4
Brunswick	12.8	9.8	3.0	29.0	24.1	4.9	New Kent	5.4	2.3	3.1	16.7	7.4	9.3
Buchanan	4.6	—	4.6	14.4	—	14.4	Norfolk	2.2	0.3	1.9	8.3	1.4	6.9
Buckingham	6.0	1.5	4.5	14.4	3.9	10.5	Northampton	2.4	2.1	0.3	9.8	8.8	1.0
Campbell	7.6	2.6	5.0	14.2	4.4	9.8	Northumberland	2.5	2.0	0.5	4.9	3.2	1.7
Caroline	10.9	6.4	4.5	34.3	18.7	15.6	Nottoway	2.1	0.8	1.3	5.2	2.4	2.8
Carroll	8.3	2.7	5.6	35.0	13.3	21.7	Orange	4.6	2.8	1.8	7.4	3.7	3.7
Charles City	5.3	3.3	2.0	16.2	11.9	4.3	Page	0.2	—	0.2	0.9	—	0.9
Charlotte	7.6	4.2	3.4	17.8	8.5	9.3	Patrick	8.4	3.5	4.9	25.3	12.5	12.8
Chesterfield	13.2	7.3	5.9	41.5	25.2	16.3	Pittsylvania	17.3	8.8	8.5	39.0	14.1	24.9
Clarke	0.2	0.2	—	0.8	0.8	—	Powhatan	5.4	2.4	3.0	16.4	7.3	9.1
Craig	—	—	—	—	—	—	Prince Edward	3.5	1.7	1.8	5.5	1.1	4.4
Culpeper	4.2	1.8	2.4	9.8	7.3	2.5	Prince George	4.6	2.1	2.5	12.3	5.9	6.4
Cumberland	4.4	3.0	1.4	7.5	3.7	3.8	Prince William	3.7	2.4	1.3	9.8	6.7	3.1
Dickenson	5.7	0.2	5.5	21.5	0.3	21.2	Princess Anne	3.5	1.2	2.3	10.3	5.7	4.6
Dinwiddie	11.6	6.8	4.8	38.4	23.8	14.6	Pulaski	1.5	1.1	0.4	1.1	1.1	—
Elizabeth City	—	—	—	—	—	—	Rappahannock	2.8	(1)	2.8	7.3	0.1	7.2
Essex	7.4	4.8	2.6	24.5	14.3	10.2	Richmond	4.6	2.3	2.3	12.7	5.4	7.3
Fairfax	5.7	2.2	3.5	12.2	5.8	6.4	Roanoke	0.5	0.2	0.3	1.0	1.0	—
Fauquier	2.8	0.5	2.3	7.5	2.3	5.2	Rockbridge	5.9	1.3	4.6	24.2	4.6	19.6
Floyd	2.2	0.8	1.4	6.5	2.6	3.9	Rockingham	3.2	0.9	2.3	12.7	3.6	9.1
Fluvanna	6.8	0.4	6.4	12.8	1.1	11.7	Russell	4.3	—	4.3	14.8	—	14.8
Franklin	18.6	5.9	12.7	48.8	10.3	38.5	Scott	2.8	—	2.8	9.8	—	9.8
Frederick	4.3	0.8	3.5	12.3	2.2	10.1	Shenandoah	0.4	0.3	0.1	1.3	0.9	0.4
Giles	0.7	—	0.7	2.8	—	2.8	Smyth	1.5	—	1.5	5.8	—	5.8
Gloucester	8.5	3.5	5.0	34.8	13.9	20.9	Southampton	13.1	6.0	7.1	42.5	20.2	22.3
Goochland	3.4	1.4	2.0	5.8	1.9	3.9	Spotsylvania	7.9	0.8	7.1	16.1	2.0	14.1
Grayson	3.2	0.2	3.0	11.3	0.7	10.6	Stafford	2.1	0.6	1.5	4.2	1.4	2.8
Greene	1.1	—	1.1	2.7	—	2.7	Surry	5.9	5.1	0.8	16.3	12.9	3.4
Greensville	4.3	3.2	1.1	15.9	11.5	4.4	Sussex	8.6	4.9	3.7	30.3	17.9	12.4
Halifax	8.6	5.5	3.1	22.5	13.6	8.9	Tazewell	2.5	0.2	2.3	8.7	—	8.7
Hanover	11.9	6.6	5.3	34.8	17.5	17.3	Warren	0.7	0.1	0.6	3.2	—	3.2
Henrico	2.4	0.8	1.6	7.5	2.6	4.9	Warwick	—	—	—	—	—	—
Henry	4.8	3.1	1.7	7.0	2.7	4.3	Washington	0.5	(1)	0.5	1.2	0.1	1.1
Highland	0.8	(1)	0.8	3.2	0.1	3.1	Westmoreland	3.7	2.4	1.3	12.4	7.4	5.0
Isle of Wight	5.6	4.0	1.6	22.7	17.0	5.7	Wise	7.1	—	7.1	25.1	—	25.1
James City	2.1	0.2	1.9	7.5	0.9	6.6	Wythe	1.3	0.4	0.9	6.1	2.1	4.0
King and Queen	11.5	5.8	5.7	35.1	12.8	22.3	York	2.4	2.0	0.4	10.1	8.2	1.9
King George	3.0	1.8	1.2	7.7	4.1	3.6							
King William	7.2	4.5	2.7	21.7	12.9	8.8	Total	466.1	196.9	269.2	1,336.4	545.0	791.4

[1] Negligible.

Table 41.—*Net annual growth of growing stock and sawtimber, by county, Virginia, 1965*

County	Growing stock			Sawtimber			County	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood		All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million cubic feet			*Million board feet*				*Million cubic feet*			*Million board feet*		
Accomack	4.8	3.8	1.0	14.2	12.0	2.2	Lancaster	0.9	0.5	0.4	3.7	1.7	2.0
Albemarle	10.7	1.9	8.8	25.6	4.2	21.4	Lee	5.0	0.3	4.7	13.6	0.5	13.1
Alleghany	4.4	0.8	3.6	11.1	2.6	8.5	Loudoun	3.5	0.2	3.3	13.2	0.6	12.6
Amelia	7.9	3.3	4.6	24.8	6.7	18.1	Louisa	7.1	2.4	4.7	14.8	4.2	10.6
Amherst	5.7	1.5	4.2	11.1	3.1	8.0	Lunenburg	8.0	2.4	5.6	21.3	7.0	14.3
Appomattox	5.5	1.9	3.6	13.4	5.3	8.1	Madison	2.8	0.5	2.3	9.4	1.3	8.1
Arlington	—	—	—	—	—	—	Mathews	1.3	0.8	0.5	4.0	2.2	1.8
Augusta	8.7	1.3	7.4	20.3	4.9	15.4	Mecklenburg	7.8	2.6	5.2	18.6	7.5	11.1
Bath	7.4	0.9	6.5	19.2	2.8	16.4	Middlesex	1.7	0.9	0.8	5.0	3.1	1.9
Bedford	11.5	3.9	7.6	24.9	5.5	19.4	Montgomery	4.7	1.3	3.4	11.8	2.4	9.4
Bland	5.5	0.6	4.9	10.4	2.7	7.7	Nansemond	8.0	2.9	5.1	26.4	13.1	13.3
Botetourt	6.6	1.1	5.5	19.9	2.6	17.3	Nelson	7.0	1.3	5.7	19.7	2.9	16.8
Brunswick	12.8	7.4	5.4	35.8	22.6	13.2	New Kent	5.5	2.2	3.3	18.1	4.8	13.3
Buchanan	8.4	0.4	8.0	21.3	1.4	19.9	Norfolk	5.4	1.8	3.6	18.4	10.0	8.4
Buckingham	9.2	2.0	7.2	18.8	4.9	13.9	Northampton	1.2	0.7	0.5	2.9	2.5	0.4
Campbell	6.1	2.0	4.1	17.8	5.3	12.5	Northumberland	2.3	1.1	1.2	9.9	4.5	5.4
Caroline	9.8	4.8	5.0	31.3	13.4	17.9	Nottoway	5.0	2.7	2.3	15.3	6.1	9.2
Carroll	6.0	1.5	4.5	15.4	4.8	10.6	Orange	4.6	1.6	3.0	10.0	1.6	8.4
Charles City	4.9	2.2	2.7	15.1	9.3	5.8	Page	2.7	0.5	2.2	6.9	1.8	5.1
Charlotte	7.7	3.4	4.3	16.6	7.7	8.9	Patrick	6.3	1.2	5.1	19.1	2.0	17.1
Chesterfield	8.1	3.3	4.8	25.4	11.1	14.3	Pittsylvania	12.5	4.5	8.0	32.0	13.2	18.8
Clarke	0.8	(1)	0.8	1.7	—	1.7	Powhatan	5.0	1.5	3.5	9.4	2.8	6.6
Craig	3.5	0.9	2.6	7.8	2.9	4.9	Prince Edward	4.6	1.4	3.2	9.9	2.9	7.0
Culpeper	3.3	1.0	2.3	8.6	1.9	6.7	Prince George	6.0	2.8	3.2	19.7	11.9	7.8
Cumberland	4.2	1.8	2.4	6.6	1.5	5.1	Prince William	4.0	0.6	3.4	14.7	3.5	11.2
Dickenson	5.2	0.3	4.9	16.5	1.6	14.9	Princess Anne	2.1	0.3	1.8	6.1	1.1	5.0
Dinwiddie	10.6	5.2	5.4	39.5	19.5	20.0	Pulaski	4.5	0.7	3.8	4.3	2.0	2.3
Elizabeth City	0.1	(1)	0.1	0.1	(1)	0.1	Rappahannock	2.0	0.1	1.9	5.3	0.4	4.9
Essex	2.8	1.4	1.4	8.5	4.9	3.6	Richmond	2.6	1.0	1.6	8.3	2.8	5.5
Fairfax	4.4	0.7	3.7	19.9	2.3	17.6	Roanoke	3.0	0.8	2.2	4.5	1.3	3.2
Fauquier	5.2	1.2	4.0	16.8	4.8	12.0	Rockbridge	6.5	1.4	5.1	18.2	2.5	15.7
Floyd	3.9	1.2	2.7	11.0	5.4	5.6	Rockingham	6.8	1.3	5.5	23.4	4.0	19.4
Fluvanna	3.3	1.3	2.0	10.7	2.8	7.9	Russell	5.4	0.1	5.3	16.7	0.4	16.3
Franklin	9.7	3.2	6.5	27.8	11.1	16.7	Scott	5.5	0.7	4.8	18.1	0.8	17.3
Frederick	3.5	0.5	3.0	13.2	1.3	11.9	Shenandoah	4.8	0.9	3.9	14.3	2.0	12.3
Giles	4.2	0.3	3.9	17.2	2.8	14.4	Smyth	6.1	0.9	5.2	17.0	2.5	14.5
Gloucester	3.2	1.9	1.3	12.0	6.6	5.4	Southampton	13.1	6.7	6.4	50.3	30.9	19.4
Goochland	4.2	1.9	2.3	10.3	1.1	9.2	Spotsylvania	7.3	3.4	3.9	15.4	7.2	8.2
Grayson	3.7	0.3	3.4	9.9	0.9	9.0	Stafford	5.2	1.2	4.0	16.4	4.4	12.0
Greene	1.6	0.2	1.4	4.1	0.2	3.9	Surry	6.5	3.6	2.9	23.0	14.3	8.7
Greensville	6.7	3.0	3.7	25.4	11.8	13.6	Sussex	12.1	6.6	5.5	44.0	27.9	16.1
Halifax	10.6	4.3	6.3	24.2	10.3	13.9	Tazewell	4.8	0.1	4.7	10.6	0.4	10.2
Hanover	8.2	3.6	4.6	20.7	10.5	10.2	Warren	2.1	0.3	1.8	3.6	0.5	3.1
Henrico	3.3	1.1	2.2	9.6	3.6	6.0	Warwick	1.0	0.5	0.5	3.9	2.2	1.7
Henry	6.1	3.3	2.8	14.2	5.7	8.5	Washington	6.7	0.6	6.1	17.1	1.8	15.3
Highland	6.8	0.9	5.9	19.3	3.4	15.9	Westmoreland	2.3	1.1	1.2	9.9	3.3	6.6
Isle of Wight	5.8	3.0	2.8	20.0	12.2	7.8	Wise	6.7	0.2	6.5	17.7	0.6	17.1
James City	3.2	1.8	1.4	8.4	3.8	4.6	Wythe	6.2	0.9	5.3	11.7	3.3	8.4
King and Queen	5.0	2.7	2.3	17.3	9.7	7.6	York	2.3	0.9	1.4	9.3	4.6	4.7
King George	3.1	0.7	2.4	7.3	0.9	6.4							
King William	4.7	2.0	2.7	17.1	8.5	8.6	Total	541.1	170.7	370.4	1,535.0	520.2	1,014.8

[1] Negligible.

WOOD · WATER · FORAGE
WILDLIFE · RECREATION
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

U. S. Forest Service Resource Bulletin SE-9 July 1967

FOREST STATISTICS for the PIEDMONT of SOUTH CAROLINA 1967

by

WILLIAM H. B. HAINES

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SOUTHEASTERN FOREST EXPERIMENT STATION
ASHEVILLE, NORTH CAROLINA

WOOD · WATER · FORAGE · WILDLIFE · RECREATION
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

U. S. Forest Service Resource Bulletin SE-9 July 1967

FOREST STATISTICS for the PIEDMONT of SOUTH CAROLINA 1967

by

WILLIAM H. B. HAINES

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SOUTHEASTERN FOREST EXPERIMENT STATION
ASHEVILLE, NORTH CAROLINA

FOREWORD

This report highlights the principal findings of the fourth Forest Survey in the Piedmont of South Carolina, completed in February 1967. Findings of the three earlier surveys, completed in 1936, 1947, and 1958, provide the basis for measuring the changes that have occurred and the trends that have developed over the past 30 years.

Forest Survey, authorized by the McSweeney-McNary Forest Research Act of May 22, 1928, as amended, is a continuing nationwide undertaking by the regional experiment stations of the U. S. Forest Service. In Florida, Georgia, North Carolina, South Carolina, and Virginia, Forest Survey is an activity of the Southeastern Forest Experiment Station, with headquarters at Asheville, North Carolina. The general objective is to inventory periodically forest lands, their extent, condition, and volume of timber, and to ascertain rates of forest growth and depletion. It is necessary to keep this basic information up to date to provide a sound basis for the formulation of forest policies and programs.

The 18-county area covered by this report is one of three Survey units in South Carolina. Comparable reports for the Northern Coastal Plain and Southern Coastal Plain will be issued as the Statewide survey progresses. When completed, this survey will provide updated statistics on the timber resource for all of South Carolina.

Joe P. McClure, Project Leader, organized and coordinated the various phases of the Piedmont Survey. Noel D. Cost was in charge of data collection. William H. B. Haines supervised the aerial photo preparation and interpretation and the data computations. Richard L. Welch was responsible for compiling timber removal and mortality information. Herbert A. Knight was in charge of analysis and reporting.

Office personnel assisting in this report were:

Gerald C. Craver
Bertie W. Greene
Cecil C. Hutchins, Jr.
Joanne Hutchison
Doniev W. Jackson
Ruth E. McIntyre
Agnes C. Nichols
Louise Shuford
Sammy S. Wenningham
Dorothy S. White
Camilla E. Young

The field party included:

John D. Nesbit, Field Supervisor
Thomas R. Bellamy, Field Assistant

Joe Max Blair
Robert A. Cathey
Edgar L. Davenport
Jeffrey E. Dukes
Leonard G. Edwards
Joseph D. Lloyd
Harold D. Matthews
David L. Pait
John F. Parlier
Douglas R. Phillips
Harry J. Van Loock III

Walton R. Smith

WALTON R. SMITH, Assistant Director
Division of Marketing, Utilization,
and Resources Research

FOREST STATISTICS
for the
PIEDMONT of SOUTH CAROLINA
1967

by

WILLIAM H. B. HAINES, ASSOCIATE MENSURATIONIST

CONTENTS

Page

HIGHLIGHTS - 1

HOW THE FOREST SURVEY IS MADE - - - - - - - - - - - - - - - - - - 3

RELIABILITY OF THE DATA - 4

DEFINITION OF TERMS - 5

COUNTY TABLES:

1. Area, by land class - 13
2. Area of commercial forest land, by ownership class - - - - - 14
3. Area of commercial forest land, by forest type group - - - - 15
4. Area of commercial forest land, by stand-size class - - - - 16
5. Area of commercial forest land, by site class - - - - - - - 17
6. Area of commercial forest land, by stocking classes of growing-stock trees - 18
7. Volume of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - - - - 19
8. Net annual growth of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - 20
9. Annual removals of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - 21

UNIT TABLES:

10. Area of commercial forest land, by forest type and ownership class - 22
11. Area of commercial forest land, by ownership and stocking classes of growing-stock trees - - - - - - - - - - - - - - - 22
12. Volume of timber on commercial forest land, by class and species group - 23
13. Number of growing-stock trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - 24
14. Volume of all live trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - 25
15. Volume of growing stock on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - 26
16. Volume of sawtimber on commercial forest land, by species and diameter class - 27
17. Net annual growth and removals of growing stock on commercial forest land, by species - - - - - - - - - - - - - - - 28
18. Net annual growth and removals of sawtimber on commercial forest land, by species - - - - - - - - - - - - - - - - - - 29
19. Annual mortality of growing stock and sawtimber on commercial forest land, by species - - - - - - - - - - - - - - - 30
20. Volume of all live trees and growing stock on commercial forest land, by ownership class and species group - - - - - 31
21. Volume of sawtimber on commercial forest land, by ownership class and species group - - - - - - - - - - - - - - - - 31
22. Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group - - 32
23. Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group - - - - - 32
24. Average net volume per acre of sawtimber, growing stock, and cull timber on commercial forest land, by ownership class, major forest type, and species group - - - - - - - - 33
25. Land area, by class, major forest type, and survey completion date - 34
26. Volume of sawtimber, growing stock, and all timber on commercial forest land, by species group, diameter class, and survey completion date - - - - - - - - - - - - - - - - - - - 35

HIGHLIGHTS

Since 1958 in the South Carolina Piedmont--

--area of commercial forest has increased from 4.1 to almost 4.5 million acres. About 66 percent of the total land area is now in commercial forest. Especially noticeable is the reversion of over 400,000 acres of former agricultural lands to forest. However, over 135,000 acres of commercial forest were lost to other land uses during the remeasurement period. Almost half of this loss was to urban development and the construction of new reservoirs.

--area in pine and oak-pine cover types has increased by about one-fifth, from 63 to almost 72 percent of the commercial forest. In contrast, there was a 17-percent decline in the area in hardwood cover types. Pines are present or predominant on most of the reversions from idle farmland to forest. Loblolly pine, with 1.3 million acres, is the leading cover type.

--commercial forest land owned by farm operators has been reduced by half. This reduction has been brought about by a shift in ownership from farmers to business and professional people, wage earners, land-holding companies, and other miscellaneous private groups. Collectively, these miscellaneous private owners now own 2.3 million acres, or 52 percent of the commercial forest. Forest industry holdings are up by 145,000 acres. Area in public ownerships has increased slightly.

--sapling and seedling stands have increased by 580,000 acres, largely the result of natural reversion and planting. Acreage in poletimber stands has remained about the same, and sawtimber stands have declined by 230,000 acres. The area in nonstocked forest land is down from 112,900 to 21,700 acres.

--average stand density of all live trees 5.0 inches d.b.h. and larger expressed in basal area per acre has increased from 46 to 51 square feet. Softwoods comprise 52 percent of this basal area, the same proportion as in 1958. Today, only about one acre in five is fully stocked with growing-stock trees.

--volume of softwood growing stock, primarily pine, has increased almost 23 percent, with an even larger increase (29 percent) in volume of softwood sawtimber. This increase reverses the downward trend in softwood volume between 1936 and 1958. Loblolly and Virginia pines comprised most of the recent increase. In poletimber trees, the volume of shortleaf pine exceeds that of loblolly pine. However, total volume of shortleaf has declined, largely because of removals in the attempt to control littleleaf disease, to which the species is particularly subject.

--volume of hardwood has continued to increase, and at a faster rate than between the two previous surveys. Volume of hardwood growing stock is up 19 percent compared to an 11-percent increase between 1947 and 1958. Volume of hardwood sawtimber is up almost 17 percent compared to a 6-percent increase between 1947 and 1958. The red oaks as a group comprised most of the increase. However, white oak, yellow-poplar, and soft maple have also made substantial gains.

In 1966--

--net growth of growing stock exceeded removals by an estimated 68.3 million cubic feet, or 46 percent. Slightly over half of this growth over removal was softwood. By ownership, 45 percent of the excess growth was in the miscellaneous private class, 31 percent on public holdings, and the remaining 24 percent on farmer and forest industry holdings.

--net growth of sawtimber exceeded removals by an estimated 157.3 million board feet, or 37 percent. Two-thirds of this growth over removal was softwood. By ownership, 47 percent of the excess growth was on public holdings, 29 percent on miscellaneous private lands, and the remaining 24 percent on farmer and forest industry holdings.

--mortality of growing stock was estimated to total 16.2 million cubic feet. Almost 63 percent of this total was softwood. Littleleaf disease was the leading identifiable cause of death. For both softwood and hardwood, suppression and climatic factors were also significant causes of death.

HOW THE FOREST SURVEY IS MADE

The method of survey is essentially a sampling procedure designed to provide reliable statistics primarily at the State and Survey Unit levels. Individual county statistics are presented to permit adding any combination of counties together until the total is large enough to meet the desired degree of reliability. The basic steps of the survey procedure were as follows:

1. Initial estimates of forest and nonforest areas were based on the classification of 38,236 sample points systematically spaced on the latest aerial photographs available.

2. The initial estimates of area by land-use class were either verified or adjusted on the basis of a ground check at 1,582 of these sample points.

3. Estimates of timber volume and forest classifications were based on measurements recorded at 1,064 of the ground check locations which fell within commercial forest land. A 10-point cluster of plots systematically spaced on an acre were measured at each of these sample locations using a basal area factor of 37.5 square feet per acre. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

4. Equations prepared from detailed measurements collected on the trees tallied at one out of every 20 sample locations were used to compute the volumes of individual tally trees. A mirror caliper and sectional aluminum poles were used to obtain the additional measurements on standing trees required to construct the volume equations. The same 5-percent subsample of plots used for the tree-volume study also served as a quality control of field measurements. Felled trees were measured at active cutting operations to provide utilization factors for product and species groups and to supplement the standing tree-volume study.

5. Permanent sample plots established in 1957 were reconstructed where possible, and their remeasurement provided the primary estimates of growth, removal, and mortality.

6. Ownership information was collected from local contacts, correspondence, and public records. In those counties where the sample missed a particular ownership class, temporary sample plots were added and measured to describe the forest conditions within the ownership class.

7. All field data were sent to Asheville for editing and were punched in cards and stored on magnetic tape for machine computing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

RELIABILITY OF THE DATA

Statistical analysis of these data indicates a sampling error of ±0.9 percent for the estimate of total commercial forest area, and 2.7 percent for both total cubic volume and growth. As these totals are broken down by county, forest type, species, tree diameter, and other subdivisions, the sampling error increases. The order of this increase is suggested in the following tabulation which shows the sampling error to which the estimates are liable, in terms of one standard error.

Forest area	Sampling error[1]	Cubic volume	Sampling error[1]	Net cu.-ft. growth	Sampling error[1]
Thousand acres	Percent	Million cu. ft.	Percent	Million cu. ft.	Percent
4,453.9	0.9				
3,607.7	1.0				
901.9	2.0	3,628.0	2.7	216.5	2.7
400.9	3.0	2,938.7	3.0	175.4	3.0
225.5	4.0	1,653.0	4.0	98.6	4.0
144.3	5.0	1,057.9	5.0	63.1	5.0
36.1	10.0	264.5	10.0	15.8	10.0
16.0	15.0	117.5	15.0	7.0	15.0
9.0	20.0	66.1	20.0	3.9	20.0
5.8	25.0	42.3	25.0	2.5	25.0

1/ By random-sampling formula.

DEFINITIONS OF TERMS

Acceptable trees.--Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.

Basal area.--The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand usually expressed as square feet of basal area per acre.

Commercial forest land.--Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

Commercial species.--Tree species presently or prospectively suitable for industrial wood products.

Cropland.--Land under cultivation within the past 24 months, including orchards and land in soil-improving crops, but excluding land cultivated in developing improved pasture. Also includes idle farmland.

Desirable trees.--Growing-stock trees of commercial species having no serious defects in quality limiting present or prospective use for timber products, of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age.

Diameter class.--A classification of trees based on diameter outside bark, measured at breast height ($4\frac{1}{2}$ feet above the ground). D.b.h. is the common abbreviation for "diameter at breast height." Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h., inclusive.

Farm.--Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totaled $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for the year amounted to at least $250.

Farm operator.--A person who operates a farm, either doing the work himself or directly supervising the work.

Farmer-owned lands.--Lands owned by farm operators.

Forest industry lands.--Lands owned by companies or individuals operating wood-using plants.

Forest land.--Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest type.--A classification of forest land based upon the species forming a plurality of live-tree stocking.

White pine-hemlock.--Forests in which eastern white pine or hemlock, singly or in combination, comprises a plurality of the stocking. (Common associates include birch and maple.)

Longleaf-slash pine.--Forests in which longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Loblolly-shortleaf pine.--Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Oak-pine.--Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.--Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress.--Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprises a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood.--Forests in which elm, ash, or cottonwood, singly or in combination, comprises a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Gross growth.--Annual increase in net volume of trees in the absence of cutting and mortality.

Growing-stock trees.--Live trees of commercial species qualifying as desirable or acceptable trees.

Growing-stock volume.--Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs.

Hardwoods.--Dicotyledonous trees, usually broad-leaved and deciduous.

Soft hardwoods.--Soft-textured hardwoods such as boxelder, red and silver maple, buckeye, hackberry, loblolly-bay, silverbell (in mts.), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm.

Hard hardwoods.--Hard-textured hardwoods such as Florida and sugar maple, birch, hickory, dogwood, persimmon (forest grown), beech, ash, honeylocust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Idle farmland.--Includes former croplands, orchards, improved pastures and farm sites not tended within the past two years, and presently less than 16.7 percent stocked with trees.

Improved pasture.--Land currently improved for grazing by cultivation, seeding, irrigation, or clearing of trees or brush.

Industrial wood.--All roundwood products except fuelwood.

Land area.

Bureau of the Census.--The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area.

Forest Survey.--The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet, and minimum size of lakes, etc., is 1 acre.

Logging residues.--The unused portions of trees cut or killed by logging.

Miscellaneous Federal lands.--Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

Miscellaneous private lands - corporate.--Lands owned by private corporations other than forest industry.

Miscellaneous private lands - individual.--Privately owned lands other than forest-industry, farmer-owned, or corporate lands.

Mortality.--Number or sound-wood volume of live trees dying from natural causes during a specified period.

National Forest land.--Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Net annual growth.--The increase in volume of a specified size class for a specific year.

Net volume.--Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial forest land.--(a) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and (b) productive-reserved forest land.

Noncommercial species.--Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land.--Land that has never supported forests and lands formerly forested where use for timber management is precluded by development for other uses.

Nonstocked land.--Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Other Federal lands.--Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

Other public lands.--Publicly-owned lands other than National Forests.

Overstocked areas.--Areas where growth of trees is significantly reduced by excessive numbers of trees.

Poletimber trees.--Growing-stock trees of commercial species at least 5.0 inches in d.b.h. but smaller than sawtimber size.

Productive-reserved forest land.--Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation.

Rangeland.--Land on which the natural plant cover is composed principally of native grasses, forbs, or shrubs valuable for forage.

Rotten trees.--Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively and/or do not meet Regional specifications for freedom from defect primarily because of rot.

Rough trees.--(a) Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively and/or do not meet Regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Salvable dead trees.--Standing or down dead trees that are considered merchantable by Regional standards.

Saplings.--Live trees 1.0 inch to 5.0 inches in diameter at breast height.

Saw log.--A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, and with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods), or other combinations of size and defect specified by Regional standards.

Saw-log portion.--That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.--The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber trees.--Live trees of commercial species containing at least a 12-foot saw log and meeting Regional specifications for freedom from defect. Softwoods must be at least 9.0 inches and hardwoods at least 11.0 inches in diameter at breast height.

Sawtimber volume.--Net volume of the saw-log portion of live sawtimber in board-foot International 1/4-inch rule.

Seedlings.--Live trees less than 1.0 inch in diameter at breast height that are expected to survive according to Regional standards.

Site class.--A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Class 1.--Sites capable of producing 165 or more cubic feet per acre annually.

Class 2.--Sites capable of producing 120 to 165 cubic feet per acre annually.

Class 3.--Sites capable of producing 85 to 120 cubic feet per acre annually.

Class 4.--Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 5.--Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

Softwoods.--Coniferous trees, usually evergreen, having needles or scale-like leaves.

Pines.--Yellow pine species which include loblolly, longleaf, slash, shortleaf, pitch, Virginia, Table-Mt., sand, and spruce pine.

Other softwoods.--White pine, hemlock, cypress, eastern redcedar, white-cedar, spruce, and fir.

Stand-size class.--A classification of forest land based on the size class of growing-stock trees on the area.

Sawtimber stands.--Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.--Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.--Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and/or seedlings.

State, county, and municipal lands.--Lands owned by States, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Stocking.--The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand and spacing in the stand, compared to a minimum standard of 75 square feet of basal area per acre to fully utilize the growth potential of the land.

Timber removals.--The net volume of growing-stock trees removed from the inventory by harvesting; cultural operations, such as stand improvement; land clearing, or changes in land use.

Unproductive forest land.--Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

Upper-stem portion.--That part of the bole of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Urban and other areas.--Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

Water.

Bureau of the Census.--Streams, sloughs, estuaries, and canals more than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds more than 40 acres in area.

Forest Survey.--The same as Census except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

Conversion factors:

Cubic feet of wood per average cord (excluding bark)

D.b.h. class	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
6	60.5	60.9	67.9	59.4	59.5
8	68.2	68.0	75.9	68.3	68.1
10	73.0	72.9	80.5	73.1	73.1
12	76.5	76.4	84.9	76.2	76.3
14	78.8	79.3	88.2	78.3	78.3
16	80.4	81.4	89.4	79.7	79.7
18	81.6	83.1	92.4	80.7	80.7
20	82.5	84.7	93.2	81.4	81.5
22	83.8	86.7	95.6	82.5	82.4
24+	84.2	90.6	98.2	83.8	83.9
Average	73.1	72.3	78.5	73.9	73.6

COUNTY TABLES

The county tables are intended for use in compiling forest resource estimates for groups of counties. Because the sampling procedure used by the Forest Survey in the South Carolina Piedmont was intended primarily to furnish inventory data for the Unit as a whole, individual county estimates have limited and variable accuracy. As county totals are broken down by various subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the tabulation on page 4.

Table 1.--Area, by land class and county, 1967

County	All land[1/]	Forest land				Nonforest land[2/]
		Total	Commercial forest	Unproductive forest	Productive reserved	
	Thousand acres					
Abbeville	324.5	212.5	212.5	--	--	112.0
Anderson	481.1	207.6	207.6	--	--	273.5
Cherokee	252.2	134.7	133.7	--	1.0	117.5
Chester	374.4	271.2	271.1	--	0.1	103.2
Edgefield	307.8	230.2	230.0	--	0.2	77.6
Fairfield	447.4	386.3	386.3	--	--	61.1
Greenville	504.9	280.6	257.8	--	22.8	224.3
Greenwood	286.1	212.9	212.5	--	0.4	73.2
Lancaster	322.6	231.5	231.4	--	0.1	91.1
Laurens	448.6	290.1	290.1	--	--	158.5
McCormick	232.9	213.5	212.8	--	0.7	19.4
Newberry	407.0	320.3	320.0	--	0.3	86.7
Oconee	422.1	336.0	329.0	--	7.0	86.1
Pickens	320.6	226.8	223.5	--	3.3	93.8
Saluda	282.9	166.3	166.3	--	--	116.6
Spartanburg	531.2	263.8	261.4	--	2.4	267.4
Union	329.6	251.8	251.7	--	0.1	77.8
York	438.4	264.1	256.2	--	7.9	174.3
Total	6,714.3	4,500.2	4,453.9	--	46.3	2,214.1

1/ From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

2/ Includes 66,200 acres of water according to Survey standards of area classification but defined by Bureau of the Census as land.

Table 2.--Area of commercial forest land, by ownership class and county, 1967

County	All ownerships	Ownership class							
		National Forest	Miscellaneous Federal	State	County and municipal	Forest industry 1/	Farmer	Miscellaneous private	
								Corporate	Individual
	Thousand acres								
Abbeville	212.5	20.8	0.8	--	0.3	48.7	14.2	14.2	113.5
Anderson	207.6	--	7.0	5.2	0.1	8.0	58.2	25.0	104.1
Cherokee	133.7	--	--	--	0.4	12.1	42.8	--	78.4
Chester	271.1	11.6	--	0.3	0.5	51.5	134.1	16.2	56.9
Edgefield	230.0	27.7	--	--	0.2	42.1	34.6	--	125.4
Fairfield	386.3	12.1	--	--	0.1	76.2	97.7	4.9	195.3
Greenville	257.8	--	--	0.9	1.8	6.8	53.8	12.4	182.1
Greenwood	212.5	10.1	--	0.6	2.6	24.5	23.0	23.0	128.7
Lancaster	231.4	--	--	0.3	0.1	24.0	86.3	12.9	107.8
Laurens	290.1	20.0	--	1.1	1.0	53.9	72.7	--	141.4
McCormick	212.8	45.8	26.4	1.1	0.6	38.7	13.8	--	86.4
Newberry	320.0	53.8	--	--	1.0	32.5	105.8	--	126.9
Oconee	329.0	65.7	5.4	7.3	2.1	0.9	91.7	50.4	105.5
Pickens	223.5	--	0.8	8.8	0.2	1.6	40.8	44.9	126.4
Saluda	166.3	4.1	--	--	0.2	25.4	62.4	--	74.2
Spartanburg	261.4	--	--	4.5	2.2	17.5	74.9	8.3	154.0
Union	251.7	56.4	--	--	0.1	39.7	85.3	--	70.2
York	256.2	--	--	--	0.5	16.7	91.2	13.1	134.7
Total	4,453.9	328.1	40.4	30.1	14.0	520.8	1,183.3	225.3	2,111.9

1/ Not including 4,300 acres of farmer and miscellaneous private lands leased to forest industry.

Table 3.--Area of commercial forest land, by forest-type group and county, 1967

County	All type groups	Forest-type groups						
		White pine-hemlock	Longleaf-slash pine	Loblolly-shortleaf pine	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood
	Thousand acres							
Abbeville	212.5	--	--	119.3	34.7	58.5	--	--
Anderson	207.6	--	--	89.5	37.4	68.2	--	12.5
Cherokee	133.7	--	--	61.1	32.1	40.5	--	--
Chester	271.1	--	--	159.6	57.2	47.9	--	6.4
Edgefield	230.0	--	--	142.7	58.3	26.3	--	2.7
Fairfield	386.3	--	--	288.7	46.8	41.0	--	9.8
Greenville	257.8	--	--	63.0	41.4	149.2	--	4.2
Greenwood	212.5	--	--	120.9	36.8	54.8	--	--
Lancaster	231.4	--	--	130.8	41.3	50.7	--	8.6
Laurens	290.1	--	--	151.3	40.3	86.4	--	12.1
McCormick	212.8	--	--	142.8	45.2	13.7	--	11.1
Newberry	320.0	--	--	231.2	55.7	18.5	--	14.6
Oconee	329.0	4.6	--	120.8	69.3	125.1	--	9.2
Pickens	223.5	4.1	--	62.4	48.9	104.0	--	4.1
Saluda	166.3	--	--	117.0	16.7	32.6	--	--
Spartanburg	261.4	--	--	145.9	33.3	82.2	--	--
Union	251.7	--	--	122.5	40.3	75.1	--	13.8
York	256.2	--	--	115.9	57.9	78.1	--	4.3
Total	4,453.9	8.7	--	2,385.4	793.6	1,152.8	--	113.4

Table 4.--Area of commercial forest land, by stand-size class and county, 1967

County	All stands	Stand-size class			Nonstocked areas
		Sawtimber	Poletimber	Sapling and seedling	
	Thousand acres				
Abbeville	212.5	44.2	70.4	97.9	--
Anderson	207.6	42.1	111.1	50.3	4.1
Cherokee	133.7	18.7	68.1	46.9	--
Chester	271.1	40.1	107.4	123.6	--
Edgefield	230.0	125.1	65.4	35.2	4.3
Fairfield	386.3	86.5	118.9	180.9	--
Greenville	257.8	84.6	106.6	66.6	--
Greenwood	212.5	110.4	54.1	48.0	--
Lancaster	231.4	37.8	80.3	113.3	--
Laurens	290.1	75.2	95.5	119.4	--
McCormick	212.8	86.2	76.5	50.1	--
Newberry	320.0	163.9	56.5	99.6	--
Oconee	329.0	109.8	136.0	83.2	--
Pickens	223.5	79.1	94.0	46.3	4.1
Saluda	166.3	56.1	79.0	31.2	--
Spartanburg	261.4	33.6	133.2	90.4	4.2
Union	251.7	69.3	120.8	56.6	5.0
York	256.2	27.5	88.1	140.6	--
Total	4,453.9	1,290.2	1,661.9	1,480.1	21.7

Table 5.--Area of commercial forest land, by site class and county, 1967

County	All classes	Site class				
		1	2	3	4	5
	Thousand acres					
Abbeville	212.5	--	--	22.1	133.1	57.3
Anderson	207.6	--	8.3	8.3	164.8	26.2
Cherokee	133.7	--	--	10.7	66.0	57.0
Chester	271.1	--	--	23.4	202.5	45.2
Edgefield	230.0	--	--	27.8	168.7	33.5
Fairfield	386.3	--	--	21.5	272.4	92.4
Greenville	257.8	--	16.5	54.4	144.6	42.3
Greenwood	212.5	--	--	32.2	146.6	33.7
Lancaster	231.4	--	--	25.0	142.9	63.5
Laurens	290.1	--	6.7	28.5	210.9	44.0
McCormick	212.8	--	3.5	12.8	166.5	30.0
Newberry	320.0	--	14.7	41.3	234.7	29.3
Oconee	329.0	4.6	4.6	52.1	187.1	80.6
Pickens	223.5	8.1	4.1	15.3	143.0	53.0
Saluda	166.3	--	--	9.8	136.8	19.7
Spartanburg	261.4	--	4.1	37.5	163.2	56.6
Union	251.7	--	--	52.1	163.1	36.5
York	256.2	--	--	14.5	187.0	54.7
Total	4,453.9	12.7	62.5	489.3	3,033.9	855.5

Table 6.--Area of commercial forest land, by stocking classes of growing-stock trees, by county, 1967

County	All classes	Stocking percentage[1]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
Abbeville	212.5	--	26.8	122.7	63.0	--
Anderson	207.6	--	28.4	124.6	50.5	4.1
Cherokee	133.7	--	7.1	90.0	36.6	--
Chester	271.1	3.6	31.1	191.7	44.7	--
Edgefield	230.0	4.3	55.3	116.6	49.5	4.3
Fairfield	386.3	4.9	98.6	241.1	41.7	--
Greenville	257.8	--	42.3	150.2	65.3	--
Greenwood	212.5	4.6	40.8	136.2	30.9	--
Lancaster	231.4	4.3	35.4	146.2	45.5	--
Laurens	290.1	--	48.4	159.8	81.9	--
McCormick	212.8	10.6	59.9	108.3	34.0	--
Newberry	320.0	10.6	67.7	163.7	78.0	--
Oconee	329.0	--	21.5	184.6	122.9	--
Pickens	223.5	--	5.0	147.3	67.1	4.1
Saluda	166.3	3.9	55.5	78.0	28.9	--
Spartanburg	261.4	8.3	57.7	124.0	67.2	4.2
Union	251.7	3.8	46.8	152.7	43.4	5.0
York	256.2	4.3	43.5	154.9	53.5	--
Total	4,453.9	63.2	771.8	2,592.6	1,004.6	21.7

1/ Stocking percentage is based on a standard of 75 square feet per acre.

Table 7.--Volume of sawtimber and growing stock on commercial forest land, by species group and county, 1967

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet[1/]				
Abbeville	334.3	186.5	0.9	100.3	46.6	152.6	73.6	1.9	41.4	35.7
Anderson	281.4	113.8	3.7	76.4	87.5	152.2	60.9	2.2	31.2	57.9
Cherokee	162.2	63.4	1.0	34.2	63.6	88.7	37.7	0.5	13.8	36.7
Chester	325.5	118.7	7.8	75.8	123.2	155.0	62.8	7.0	34.4	50.8
Edgefield	795.4	655.2	1.4	86.5	52.3	253.2	194.4	1.0	34.2	23.6
Fairfield	593.8	448.9	5.8	79.8	59.3	244.3	174.1	3.5	33.6	33.1
Greenville	520.0	119.1	2.2	114.8	283.9	230.0	58.3	0.5	54.3	116.9
Greenwood	688.5	495.6	1.3	98.2	93.4	238.7	156.0	2.1	37.2	43.4
Lancaster	261.4	148.4	1.7	41.8	69.5	134.0	67.2	2.4	22.4	42.0
Laurens	462.6	229.7	6.2	118.0	108.7	204.2	89.2	4.2	55.3	55.5
McCormick	711.6	519.0	1.7	109.3	81.6	243.1	162.7	1.8	40.2	38.4
Newberry	961.0	789.6	4.2	98.0	69.2	322.0	242.3	3.8	41.8	34.1
Oconee	639.1	278.3	60.2	51.3	249.3	270.8	109.6	15.7	28.4	117.1
Pickens	540.3	200.1	14.2	85.3	240.7	230.1	75.8	5.7	35.0	113.6
Saluda	439.4	327.2	--	27.5	84.7	177.3	121.9	--	17.5	37.9
Spartanburg	271.0	148.5	0.7	53.9	67.9	158.3	86.6	0.6	24.1	47.0
Union	626.4	300.3	3.6	172.1	150.4	235.1	111.3	2.7	57.4	63.7
York	267.0	60.3	1.4	132.6	72.7	138.4	42.7	2.8	48.0	44.9
Total	8,880.9	5,202.6	118.0	1,555.8	2,004.5	3,628.0	1,927.1	58.4	650.2	992.3

1/ Factors for converting to cords are shown on page 11.

Table 8.--Net annual growth of sawtimber and growing stock on commercial forest land, by species group and county, 1966

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Abbeville	22.9	15.2	--	3.9	3.8	8.4	4.9	0.1	1.7	1.7
Anderson	22.9	11.1	0.1	4.3	7.4	8.9	4.0	0.1	1.2	3.6
Cherokee	13.8	7.5	--	1.1	5.2	6.6	3.2	--	1.4	2.0
Chester	17.0	7.8	0.3	4.4	4.5	9.0	4.9	0.3	1.8	2.0
Edgefield	49.3	44.3	--	3.3	1.7	14.9	12.7	--	1.3	0.9
Fairfield	48.5	37.6	0.3	5.7	4.9	18.2	14.9	0.2	1.4	1.7
Greenville	21.2	7.8	0.1	4.2	9.1	12.2	4.8	--	3.1	4.3
Greenwood	38.6	30.9	0.1	3.7	3.9	14.1	10.1	0.1	1.4	2.5
Lancaster	15.7	10.5	0.1	1.5	3.6	10.4	6.1	0.8	1.5	2.0
Laurens	33.5	21.2	0.1	6.4	5.8	11.3	6.3	0.1	2.4	2.5
McCormick	45.5	37.5	--	4.5	3.5	14.1	10.2	0.6	1.8	1.5
Newberry	73.3	66.9	0.2	3.6	2.6	18.3	14.5	0.8	1.5	1.5
Oconee	37.2	18.0	2.6	4.4	12.2	14.5	6.7	0.9	1.4	5.5
Pickens	35.6	14.1	1.0	9.1	11.4	11.4	4.7	0.4	1.7	4.6
Saluda	34.0	27.9	--	1.9	4.2	12.2	9.6	--	0.8	1.8
Spartanburg	21.9	12.9	--	2.5	6.5	11.3	7.5	--	1.2	2.6
Union	34.1	20.0	0.2	6.8	7.1	11.7	6.8	0.1	2.1	2.7
York	14.0	3.3	--	5.6	5.1	9.0	4.6	0.1	1.9	2.4
Total	579.0	394.5	5.1	76.9	102.5	216.5	136.5	4.6	29.6	45.8

Table 9.--Annual removals of sawtimber and growing stock on commercial forest land, by species group and county, 1966

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Abbeville	29.4	22.3	--	6.0	1.1	9.8	7.2	0.1	1.9	0.6
Anderson	19.0	12.1	--	4.0	2.9	6.0	3.5	--	1.5	1.0
Cherokee	12.6	7.4	--	2.6	2.6	4.5	2.9	--	0.9	0.7
Chester	17.2	8.6	0.6	3.7	4.3	8.4	4.4	0.5	1.8	1.7
Edgefield	17.1	12.1	--	4.5	0.5	7.5	5.7	--	1.5	0.3
Fairfield	34.8	30.4	--	3.0	1.4	13.4	11.0	0.2	1.4	0.8
Greenville	19.5	8.2	--	4.4	6.9	5.9	2.6	--	1.4	1.9
Greenwood	40.7	31.8	--	7.5	1.4	10.9	8.5	--	1.9	0.5
Lancaster	17.0	14.7	--	0.3	2.0	6.1	5.3	--	0.2	0.6
Laurens	32.4	22.6	0.3	7.5	2.0	10.1	7.3	0.1	2.1	0.6
McCormick	9.0	7.8	--	--	1.2	4.4	3.9	--	0.2	0.3
Newberry	41.5	36.6	0.5	1.9	2.5	14.7	12.6	0.3	0.7	1.1
Oconee	39.8	14.8	13.0	0.4	11.6	12.5	5.5	2.6	0.1	4.3
Pickens	15.4	2.8	2.9	1.5	8.2	6.5	2.2	0.6	1.0	2.7
Saluda	21.5	12.9	0.3	5.0	3.3	6.9	4.1	0.3	1.5	1.0
Spartanburg	18.4	13.3	--	4.0	1.1	6.0	4.5	--	1.1	0.4
Union	20.7	8.5	--	9.5	2.7	6.8	3.5	--	2.5	0.8
York	15.7	9.2	0.9	1.8	3.8	7.8	5.7	0.4	0.7	1.0
Total	421.7	276.1	18.5	67.6	59.5	148.2	100.4	5.1	22.4	20.3

Table 10.--Area of commercial forest land, by forest type and ownership class, 1967

Forest type	All ownerships	Ownership class				
		National Forest	Other public	Forest industry	Farmer	Misc. private
	Thousand acres					
Softwood types:						
White pine-hemlock	8.7	--	--	--	8.7	--
Longleaf pine	--	--	--	--	--	--
Slash pine	--	--	--	--	--	--
Loblolly pine	1,319.4	139.8	37.5	235.7	272.4	634.0
Shortleaf pine	821.8	78.8	14.4	101.6	208.3	418.7
Virginia pine	162.6	4.7	6.2	--	41.9	109.8
Redcedar	77.0	--	1.2	9.0	35.4	31.4
Pond pine	--	--	--	--	--	--
Pitch pine	4.6	--	--	--	--	4.6
Total	2,394.1	223.3	59.3	346.3	566.7	1,198.5
Hardwood types:						
Oak-pine	793.6	55.8	4.3	71.3	241.1	421.1
Oak-hickory	1,143.9	32.0	20.9	95.7	323.1	672.2
Southern scrub oak	8.9	--	--	--	8.9	--
Oak-gum-cypress	--	--	--	--	--	--
Elm-ash-cottonwood	113.4	17.0	--	7.5	43.5	45.4
Total	2,059.8	104.8	25.2	174.5	616.6	1,138.7
All types	4,453.9	328.1	84.5	520.8	1,183.3	2,337.2

Table 11.--Area of commercial forest land, by ownership and stocking classes of growing-stock trees, 1967

Ownership classes	All classes	Stocking percentage[1/]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
National Forest	328.1	11.4	103.7	154.3	58.7	--
Other public	84.5	2.9	20.0	45.4	16.2	--
Forest industry	520.8	3.6	124.0	311.7	81.5	--
Farmer	1,183.3	3.5	146.2	708.5	310.8	9.3
Misc. private	2,337.2	36.8	377.9	1,372.7	537.4	12.4
All ownerships	4,453.9	63.2	771.8	2,592.6	1,004.6	21.7

1/ Stocking percentage is based on a standard of 75 square feet per acre.

Table 12.--Volume of timber on commercial forest land, by class and species group, 1967

Class of timber	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet				
Sawtimber trees:					
Saw-log portion	2,079.1	1,136.1	27.8	380.5	534.7
Upper-stem portion	248.2	128.6	3.8	45.6	70.2
Total	2,327.3	1,264.7	31.6	426.1	604.9
Poletimber trees	1,300.7	662.4	26.8	224.1	387.4
All growing-stock trees	3,628.0	1,927.1	58.4	650.2	992.3
Rough trees:					
Sawtimber-size trees	198.6	23.5	2.1	63.0	110.0
Poletimber-size trees	322.4	46.0	7.7	109.7	159.0
Total	521.0	69.5	9.8	172.7	269.0
Rotten trees:					
Sawtimber-size trees	55.8	0.6	0.9	20.1	34.2
Poletimber-size trees	12.7	0.3	--	5.8	6.6
Total	68.5	0.9	0.9	25.9	40.8
Salvable dead trees:					
Sawtimber-size trees	5.2	2.8	2.4	--	--
Poletimber-size trees	4.6	3.6	--	1.0	--
Total	9.8	6.4	2.4	1.0	--
Total, all timber	4,227.3	2,003.9	71.5	849.8	1,302.1

Table 13.--Number of growing-stock trees on commercial forest land, by species and diameter class, 1967

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees										
Softwood:											
Longleaf pine	579	151	164	154	43	54	11	--	--	--	2
Shortleaf pine	128,007	68,868	35,040	14,397	6,257	2,346	677	289	101	32	--
Loblolly pine	149,847	71,592	34,304	21,204	11,429	6,367	2,894	1,145	535	372	5
Virginia pine	21,213	11,209	5,570	2,810	1,100	396	72	27	17	12	--
Pitch pine	914	350	343	92	89	15	25	--	--	--	--
Table-Mt. pine	102	--	41	--	19	--	25	10	7	--	--
Eastern white pine	1,213	466	308	39	252	44	14	28	9	49	4
Eastern hemlock	358	205	84	--	43	--	--	20	--	6	--
Other eastern softwoods	9,812	6,633	2,119	744	230	74	12	--	--	--	--
Total softwoods	312,045	159,474	77,973	39,440	19,462	9,296	3,730	1,519	669	471	11
Hardwood:											
Select white oaks[1/]	25,787	11,693	6,558	3,258	1,911	1,197	518	336	131	167	18
Select red oaks[2/]	5,463	1,548	1,595	958	591	367	145	107	87	64	1
Other white oaks	10,307	4,242	2,138	1,806	888	611	359	128	66	69	--
Other red oaks	38,042	14,641	10,811	5,954	3,017	1,703	1,034	469	221	163	29
Hickory	12,889	5,716	3,280	1,486	1,104	577	293	235	120	73	5
Hard maple	292	77	41	103	41	13	--	10	7	--	--
Soft maple	5,577	2,573	1,276	709	502	172	132	113	32	56	12
Beech	896	157	335	123	26	61	23	89	27	52	3
Sweetgum	34,444	18,666	7,382	3,403	2,264	1,194	819	409	160	144	3
Tupelo and blackgum	2,438	822	836	322	202	85	93	45	15	18	--
Ash	4,825	2,094	1,431	385	457	169	183	55	30	21	--
Cottonwood	359	93	44	30	19	15	58	20	22	34	24
Basswood	40	--	--	26	--	--	14	--	--	--	--
Yellow-poplar	13,127	4,331	2,936	1,796	1,581	1,205	564	394	189	118	13
Black walnut	160	60	--	48	--	32	--	--	14	6	--
Black cherry	195	113	82	--	--	--	--	--	--	--	--
Elm	6,354	2,625	2,120	847	416	216	42	64	15	9	--
Sycamore	1,175	138	204	281	199	105	87	71	37	44	9
Birch (except yellow)	3,062	1,147	1,018	257	306	143	33	72	42	44	--
Other eastern hardwoods	2,662	1,345	557	318	233	68	81	37	23	--	--
Total hardwoods	168,094	72,081	42,644	22,110	13,757	7,933	4,478	2,654	1,238	1,082	117
All species	480,139	231,555	120,617	61,550	33,219	17,229	8,208	4,173	1,907	1,553	128

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark, northern red, and Shumard oaks.

Table 14.--Volume of all live trees on commercial forest land, by species and diameter class, 1967

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	6.2	0.4	0.7	1.3	0.8	1.7	0.5	--	--	0.3	0.5
Shortleaf pine	700.7	140.5	186.7	148.2	111.5	63.7	27.0	14.7	5.7	2.7	--
Loblolly pine	1,141.1	129.0	182.3	222.7	195.1	166.2	110.8	58.6	36.6	38.5	1.3
Virginia pine	141.5	29.9	36.6	36.6	22.0	10.6	2.7	1.0	1.0	1.1	--
Pitch pine	5.6	0.7	1.6	0.8	1.3	0.5	0.7	--	--	--	--
Table-Mountain pine	2.4	--	0.3	--	0.4	--	0.9	0.4	0.4	--	--
Eastern white pine	18.5	1.0	1.8	0.4	4.7	1.3	0.4	1.5	1.0	5.7	0.7
Eastern hemlock	3.6	0.5	0.4	--	1.1	--	--	0.9	--	0.7	--
Other eastern softwoods	47.0	17.0	13.8	8.1	4.8	2.1	0.3	0.4	--	0.5	--
Total softwoods	2,066.6	319.0	424.2	418.1	341.7	246.1	143.3	77.5	44.7	49.5	2.5
Hardwood:											
Select white oaks[1/]	285.6	30.9	40.5	42.4	44.0	39.8	24.5	19.6	11.7	22.5	9.7
Select red oaks[2/]	74.2	4.6	10.2	11.4	11.3	11.6	5.2	5.7	5.7	7.1	1.4
Other white oaks	134.2	13.2	16.2	23.5	20.4	19.4	15.3	7.4	6.2	8.8	3.8
Other red oaks	438.1	42.4	69.8	77.0	65.8	57.5	45.0	28.7	17.4	23.8	10.7
Hickory	149.2	14.7	20.5	20.0	24.3	20.8	13.9	13.9	9.2	10.4	1.5
Hard maple	7.1	1.2	0.7	1.7	0.8	0.9	0.3	0.6	0.9	--	--
Soft maple	106.4	15.1	17.9	15.5	16.7	10.4	6.3	10.4	3.5	8.3	2.3
Beech	31.3	0.8	2.3	3.3	1.9	1.7	1.2	6.5	2.2	9.7	1.7
Sweetgum	327.9	43.9	49.6	48.2	54.8	39.1	38.7	22.4	12.7	16.2	2.3
Tupelo and blackgum	39.4	4.8	7.5	6.6	7.4	3.1	4.5	2.8	0.8	1.9	--
Ash	73.3	10.6	14.9	9.6	14.8	5.6	8.7	3.7	2.5	2.9	--
Cottonwood	22.2	0.2	0.2	0.3	0.3	0.4	3.4	1.4	1.9	5.9	8.2
Basswood	1.2	0.2	--	0.4	--	--	0.6	--	--	--	--
Yellow-poplar	206.2	11.3	21.0	23.8	32.9	35.9	25.6	22.7	14.1	14.2	4.7
Black walnut	3.6	0.3	0.2	0.5	0.2	0.7	--	--	1.2	0.5	--
Black cherry	10.1	4.1	2.8	2.1	0.8	0.3	--	--	--	--	--
Elm	69.3	9.8	15.9	14.5	9.6	7.8	3.0	4.1	2.8	1.8	--
Sycamore	33.7	1.1	2.3	4.1	4.4	4.3	4.4	3.7	2.5	4.7	2.2
Birch (except yellow)	45.1	4.1	9.5	5.1	6.7	6.1	1.4	4.3	3.1	4.8	--
Other eastern hardwoods	92.8	30.3	21.1	15.9	6.6	6.9	4.5	4.2	1.7	0.7	0.9
Total hardwoods	2,150.9	243.6	323.1	325.9	323.7	272.3	206.5	162.1	100.1	144.2	49.4
All species	4,217.5	562.6	747.3	744.0	665.4	518.4	349.8	239.6	144.8	193.7	51.9

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark, northern red, and Shumard oaks.

Table 15.--Volume of growing stock on commercial forest land, by species and diameter class, 1967

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	5.9	0.4	0.7	1.3	0.8	1.7	0.5	--	--	--	0.5
Shortleaf pine	675.1	132.1	177.2	143.4	109.4	63.3	26.6	14.7	5.7	2.7	--
Loblolly pine	1,110.9	118.8	172.8	214.8	193.2	166.1	110.6	58.6	36.2	38.5	1.3
Virginia pine	127.3	25.0	32.9	33.0	20.4	10.2	2.7	1.0	1.0	1.1	--
Pitch pine	5.5	0.6	1.6	0.8	1.3	0.5	0.7	--	--	--	--
Table-Mountain pine	2.4	--	0.3	--	0.4	--	0.8	0.4	0.5	--	--
Eastern white pine	18.1	0.9	1.8	0.4	4.7	1.3	0.5	1.5	0.6	5.7	0.7
Eastern hemlock	3.4	0.3	0.4	--	1.1	--	--	0.9	--	0.7	--
Other eastern softwoods	36.9	12.8	10.6	7.2	4.1	1.9	0.3	--	--	--	--
Total softwoods	1,985.5	290.9	398.3	400.9	335.4	245.0	142.7	77.1	44.0	48.7	2.5
Hardwood:											
Select white oaks[1/]	244.4	24.2	36.9	36.3	39.5	36.3	22.6	18.5	9.0	16.6	4.5
Select red oaks[2/]	67.1	3.7	8.9	10.4	10.4	10.1	5.2	5.6	5.7	6.5	0.6
Other white oaks	93.5	8.3	10.6	17.5	14.5	14.9	12.5	5.9	3.3	6.0	--
Other red oaks	352.2	30.2	56.9	61.4	53.9	45.8	40.3	25.1	15.1	16.4	7.1
Hickory	123.6	11.2	15.7	15.9	20.5	17.2	12.2	12.4	8.8	8.2	1.5
Hard maple	3.2	0.2	0.2	0.8	0.6	0.5	--	0.3	0.6	--	--
Soft maple	57.5	5.3	7.2	8.3	9.4	5.7	5.0	6.5	2.1	5.7	2.3
Beech	20.5	0.4	1.7	1.5	0.4	1.7	0.9	5.3	1.8	6.0	0.8
Sweetgum	264.2	32.1	37.5	35.9	42.2	35.0	33.6	21.1	11.3	15.0	0.5
Tupelo and blackgum	23.2	1.3	3.9	4.0	3.7	2.5	3.4	2.0	0.8	1.6	--
Ash	46.0	4.3	8.7	4.9	9.4	4.9	7.0	2.8	2.0	2.0	--
Cottonwood	21.1	0.2	0.2	0.3	0.3	0.4	3.4	1.4	1.9	4.8	8.2
Basswood	0.8	--	--	0.2	--	--	0.6	--	--	--	--
Yellow-poplar	192.1	10.3	18.4	21.2	30.8	35.6	24.1	22.7	13.4	12.4	3.2
Black walnut	2.9	0.2	--	0.5	--	0.7	--	--	1.2	0.3	--
Black cherry	0.6	0.1	0.5	--	--	--	--	--	--	--	--
Elm	48.4	5.3	12.3	9.5	7.4	6.3	2.0	3.5	1.1	1.0	--
Sycamore	27.1	0.4	1.3	3.4	3.4	3.1	3.4	3.7	2.5	4.3	1.6
Birch (except yellow)	32.2	2.5	6.3	2.4	5.4	3.8	1.2	3.8	2.3	4.5	--
Other eastern hardwoods	21.9	3.1	2.7	3.9	3.8	2.1	3.0	1.9	1.4	--	--
Total hardwoods	1,642.5	143.3	229.9	238.3	255.6	226.6	180.4	142.5	84.3	111.3	30.3
All species	3,628.0	434.2	628.2	639.2	591.0	471.6	323.1	219.6	128.3	160.0	32.8

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark, northern red, and Shumard oaks.

Table 16.--Volume of sawtimber on commercial forest land, by species and diameter class, 1967

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	21.2	6.0	3.5	7.5	2.2	--	--	--	2.0
Shortleaf pine	1,490.2	537.0	453.1	275.3	119.7	68.5	24.5	12.1	--
Loblolly pine	3,426.9	782.4	808.3	730.2	495.2	268.0	163.9	172.7	6.2
Virginia pine	243.9	111.9	75.6	36.6	9.6	2.8	3.6	3.8	--
Pitch pine	12.6	2.6	5.2	2.3	2.5	--	--	--	--
Table-Mountain pine	7.8	--	1.2	--	3.3	1.4	1.9	--	--
Eastern white pine	64.0	0.7	17.1	5.6	1.7	7.0	2.8	26.0	3.1
Eastern hemlock	12.5	--	4.6	--	--	4.5	--	3.4	--
Other eastern softwoods	41.5	21.4	12.8	6.3	1.0	--	--	--	--
Total softwoods	5,320.6	1,462.0	1,381.4	1,063.8	635.2	352.2	196.7	218.0	11.3
Hardwood:									
Select white oaks[1/]	476.4	--	115.8	123.0	78.9	61.1	30.6	55.2	11.8
Select red oaks[2/]	152.7	--	33.7	32.7	19.6	19.5	20.2	24.7	2.3
Other white oaks	193.4	--	47.3	51.5	42.9	21.4	11.1	19.2	--
Other red oaks	688.0	--	161.8	155.4	146.5	88.8	53.4	56.4	25.7
Hickory	268.6	--	61.5	59.0	40.8	44.2	29.8	28.3	5.0
Hard maple	6.2	--	2.3	1.5	--	0.4	2.0	--	--
Soft maple	101.6	--	23.7	15.7	15.1	17.4	6.9	17.3	5.5
Beech	52.8	--	1.0	5.3	2.1	17.3	6.1	18.3	2.7
Sweetgum	598.1	--	135.9	130.5	137.9	85.0	44.0	62.9	1.9
Tupelo and blackgum	42.8	--	9.6	8.5	10.0	6.6	3.3	4.8	--
Ash	90.4	--	24.4	16.6	23.4	10.4	8.3	7.3	--
Cottonwood	79.2	--	1.4	1.1	11.2	4.9	8.0	18.8	33.8
Basswood	2.7	--	--	--	2.7	--	--	--	--
Yellow-poplar	557.1	--	97.1	138.0	105.6	96.3	54.1	52.1	13.9
Black walnut	8.7	--	--	3.0	--	--	4.5	1.2	--
Black cherry	--	--	--	--	--	--	--	--	--
Elm	64.6	--	22.1	21.1	6.1	9.8	2.5	3.0	--
Sycamore	80.8	--	11.7	9.4	14.9	12.9	10.2	17.1	4.6
Birch (except yellow)	60.5	--	14.5	10.6	4.1	9.2	7.2	14.9	--
Other eastern hardwoods	35.7	--	9.7	5.8	8.6	6.4	5.2	--	--
Total hardwoods	3,560.3	--	773.5	788.7	670.4	511.6	307.4	401.5	107.2
All species	8,880.9	1,462.0	2,154.9	1,852.5	1,305.6	863.8	504.1	619.5	118.5

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark and northern red oaks.

Table 17.--Net annual growth and removals of growing stock on commercial forest land, by species, 1966

Species	Net annual growth	Annual timber removals
	Million cubic feet	
Softwood:		
Yellow pines	136.5	100.4
Eastern white pine	1.1	3.2
Other eastern softwoods	3.5	1.9
Total softwoods	141.1	105.5
Hardwood:		
Select white and red oaks	14.8	8.5
Other white and red oaks	22.8	6.2
Hickory	3.8	1.4
Hard maple	0.1	0.2
Sweetgum	11.7	9.1
Ash, walnut, and black cherry	1.8	1.4
Yellow-poplar	11.1	9.1
Other hardwoods	9.3	6.8
Total hardwoods	75.4	42.7
All species	216.5	148.2

Table 18.--Net annual growth and removals of sawtimber on commercial forest land, by species, 1966

Species	Net annual growth	Annual timber removals
	Million board feet	
Softwood:		
Yellow pines	394.5	276.1
Eastern white pine	3.1	15.9
Other eastern softwoods	2.0	2.6
Total softwoods	399.6	294.6
Hardwood:		
Select white and red oaks	36.2	26.6
Other white and red oaks	51.6	16.8
Hickory	6.6	4.3
Hard maple	0.2	--
Sweetgum	25.3	25.8
Ash, walnut, and black cherry	3.7	3.6
Yellow-poplar	32.2	31.6
Other hardwoods	23.6	18.4
Total hardwoods	179.4	127.1
All species	579.0	421.7

Table 19.--Mortality of growing stock and sawtimber on commercial forest land, by species, 1966

Species	Growing stock	Sawtimber
	Million cubic feet	Million board feet
Softwood:		
Yellow pines	9.9	22.7
Eastern white pine	--	--
Other eastern softwoods	0.3	0.9
Total softwoods	10.2	23.6
Hardwood:		
Select white and red oaks	0.1	--
Other white and red oaks	2.4	6.0
Hickory	1.0	3.9
Hard maple	--	--
Sweetgum	0.6	1.8
Ash, walnut, and black cherry	0.5	1.1
Yellow-poplar	--	--
Other hardwoods	1.4	2.6
Total hardwoods	6.0	15.4
All species	16.2	39.0

Table 20.--Volume of all live trees and growing stock on commercial forest land, by ownership class and species group, 1967

Ownership class	All live trees					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	576.3	372.2	10.6	89.1	104.4	524.0	362.3	9.6	73.4	78.7
Other public	142.3	88.4	0.5	14.9	38.5	125.1	85.8	0.5	11.6	27.2
Forestry industry	517.4	295.5	8.3	108.4	105.2	454.5	287.1	6.2	84.8	76.4
Farmer	985.6	368.5	26.2	247.9	343.0	833.9	355.9	23.0	184.5	270.5
Miscellaneous private	1,995.9	872.9	23.5	388.5	711.0	1,690.5	836.0	19.1	295.9	539.5
All ownerships	4,217.5	1,997.5	69.1	848.8	1,302.1	3,628.0	1,927.1	58.4	650.2	992.3

Table 21.--Volume of sawtimber on commercial forest land, by ownership class and species group, 1967

Ownership class	Small sawtimber[1]					Large sawtimber[2]				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	976.5	824.7	11.2	61.7	78.9	719.3	472.6	13.9	128.9	103.9
Other public	233.1	200.8	1.1	9.0	22.2	125.9	83.9	--	6.9	35.1
Forest industry	762.1	583.2	7.6	92.2	79.1	349.1	154.5	--	118.5	76.1
Farmer	1,124.2	668.7	24.6	192.4	238.5	808.2	199.4	30.0	286.3	292.5
Miscellaneous private	2,373.5	1,561.3	24.0	281.5	506.7	1,409.0	453.5	5.6	378.5	571.4
All ownerships	5,469.4	3,838.7	68.5	636.8	925.4	3,411.5	1,363.9	49.5	919.1	1,079.0

1/ Volume of sawtimber trees less than 15.0 inches at d.b.h.
2/ Volume of sawtimber trees 15.0 inches and larger at d.b.h.

Table 22.--Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group, 1966

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	25.1	18.5	0.7	2.6	3.3	8.7	8.2	--	0.3	0.2
Other public	7.6	5.4	--	1.1	1.1	3.0	2.2	--	0.5	0.3
Forest industry	29.7	21.4	1.4	3.5	3.4	22.1	17.8	0.1	1.9	2.3
Farmer	47.8	25.7	1.0	8.9	12.2	39.0	20.3	3.9	7.7	7.1
Miscellaneous private	106.3	65.5	1.5	13.5	25.8	75.4	51.9	1.1	12.0	10.4
All ownerships	216.5	136.5	4.6	29.6	45.8	148.2	100.4	5.1	22.4	20.3

Table 23.--Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group, 1966

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	90.7	73.7	1.1	7.7	8.2	33.4	31.8	--	1.0	0.6
Other public	24.2	19.1	0.1	1.8	3.2	6.8	5.0	--	0.8	1.0
Forest industry	89.2	71.9	0.2	10.1	7.0	55.3	44.7	--	4.9	5.7
Farmer	119.9	67.7	2.2	23.4	26.6	116.3	56.7	15.8	23.3	20.5
Miscellaneous private	255.0	162.1	1.5	33.9	57.5	209.9	137.9	2.7	37.6	31.7
All ownerships	579.0	394.5	5.1	76.9	102.5	421.7	276.1	18.5	67.6	59.5

Table 24.--Average net volume per acre of sawtimber, growing stock, and other live timber[1/] on commercial forest land, by ownership class, major forest type, and species group, 1967

Forest type, species group, and class of material	Ownership class											
	All ownerships		National Forest		Other public		Forest industry		Farmer		Misc. private	
	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet
Pine types:												
Growing stock:												
Softwood	1,627	626.8	4,912	1,408.4	4,612	1,360.4	1,462	585.0	1,017	461.7	1,202	534.9
Hardwood	178	105.0	420	206.2	99	158.4	166	89.9	221	116.3	120	83.5
Total	1,805	731.8	5,332	1,614.6	4,711	1,518.8	1,628	674.9	1,238	578.0	1,322	618.4
Other timber:												
Softwood	--	26.8	--	42.5	--	39.1	--	21.5	--	22.2	--	27.3
Hardwood	--	50.1	--	79.0	--	24.1	--	37.7	--	59.2	--	46.2
Total	--	76.9	--	121.5	--	63.2	--	59.2	--	81.4	--	73.5
Oak-pine type:												
Growing stock:												
Softwood	1,157	393.5	3,934	978.9	1,103	397.5	933	333.2	1,076	378.8	915	343.6
Hardwood	835	409.5	1,424	623.2	728	461.5	754	321.1	724	395.7	847	410.1
Total	1,992	803.0	5,358	1,602.1	1,831	859.0	1,687	654.3	1,800	774.5	1,762	753.7
Other timber:												
Softwood	--	13.7	--	19.7	--	--	--	13.0	--	12.8	--	14.0
Hardwood	--	143.0	--	171.8	--	260.0	--	160.7	--	143.4	--	132.8
Total	--	156.7	--	191.5	--	260.0	--	173.7	--	156.2	--	146.8
Upland hardwood types:												
Growing stock:												
Softwood	318	118.4	513	166.4	313	125.6	339	125.0	249	101.3	339	123.2
Hardwood	1,887	823.1	2,955	1,145.7	1,792	753.7	2,254	911.3	1,949	823.3	1,759	798.9
Total	2,205	941.5	3,468	1,312.1	2,105	879.3	2,593	1,036.3	2,198	924.6	2,098	922.1
Other timber:												
Softwood	--	4.0	--	11.0	--	8.6	--	2.2	--	1.9	--	4.7
Hardwood	--	202.9	--	273.1	--	313.6	--	210.7	--	193.5	--	197.6
Total	--	206.9	--	284.1	--	322.2	--	212.9	--	195.4	--	202.3
Bottomland hardwood types:												
Growing stock:												
Softwood	572	141.9	670	190.0	--	--	--	--	756	167.5	520	139.7
Hardwood	2,732	1,072.5	7,220	2,382.5	--	--	316	297.0	2,608	973.6	1,786	880.0
Total	3,304	1,214.4	7,890	2,572.5	--	--	316	297.0	3,364	1,141.1	2,306	1,019.7
Other timber:												
Softwood	--	4.6	--	--	--	--	--	--	--	2.8	--	9.5
Hardwood	--	339.4	--	394.0	--	--	--	64.0	--	205.8	--	533.7
Total	--	344.0	--	394.0	--	--	--	64.0	--	208.6	--	543.2
All types:												
Growing stock:												
Softwood	1,179	441.9	4,119	1,158.8	2,887	868.6	1,178	463.6	802	331.8	886	373.0
Hardwood	800	368.8	1,180	476.7	716	382.1	587	258.3	901	405.5	760	365.8
Total	1,979	810.7	5,299	1,635.5	3,603	1,250.7	1,765	721.9	1,703	737.3	1,646	738.8
Other timber:												
Softwood	--	18.0	--	33.6	--	25.7	--	16.7	--	13.8	--	18.0
Hardwood	--	113.3	--	128.8	--	140.2	--	83.6	--	119.9	--	115.0
Total	--	131.3	--	162.4	--	165.9	--	100.3	--	133.7	--	133.0
All timber	1,979	942.0	5,299	1,797.9	3,603	1,416.6	1,765	822.2	1,703	871.0	1,646	871.8

1/ Rough and rotten trees.

Table 25.--Land area, by class, major forest type, and survey completion date, 1947, 1958, and 1967

Land use class	Survey completion date			Change 1958-1967
	1947	1958	1967	
	- - - - - Thousand acres - - - - -			
Forest land:				
Commercial forest land:				
Pine and oak-pine types	2,992.3	2,617.5	3,187.7	+570.2
Hardwood types	1,026.4	1,528.3	1,266.2	-262.1
Total	4,018.7	4,145.8	4,453.9	+308.1
Noncommercial forest land:				
Productive-reserved	16.3	53.9	46.3	- 7.6
Unproductive	0.6	4.3	--	- 4.3
Total	16.9	58.2	46.3	- 11.9
Nonforest land:				
Cropland	2,226.4	1,808.9	1,018.6	-790.3
Pasture and range	305.6	407.3	658.8	+251.5
Other	176.1	274.2	470.5	+196.3
Total	2,708.1	2,490.4	2,147.9	-342.5
All land[1/]	6,743.7	6,694.4	6,648.1	- 46.3

1/ Excludes all water areas.

Table 26.--Volume[1/] of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date

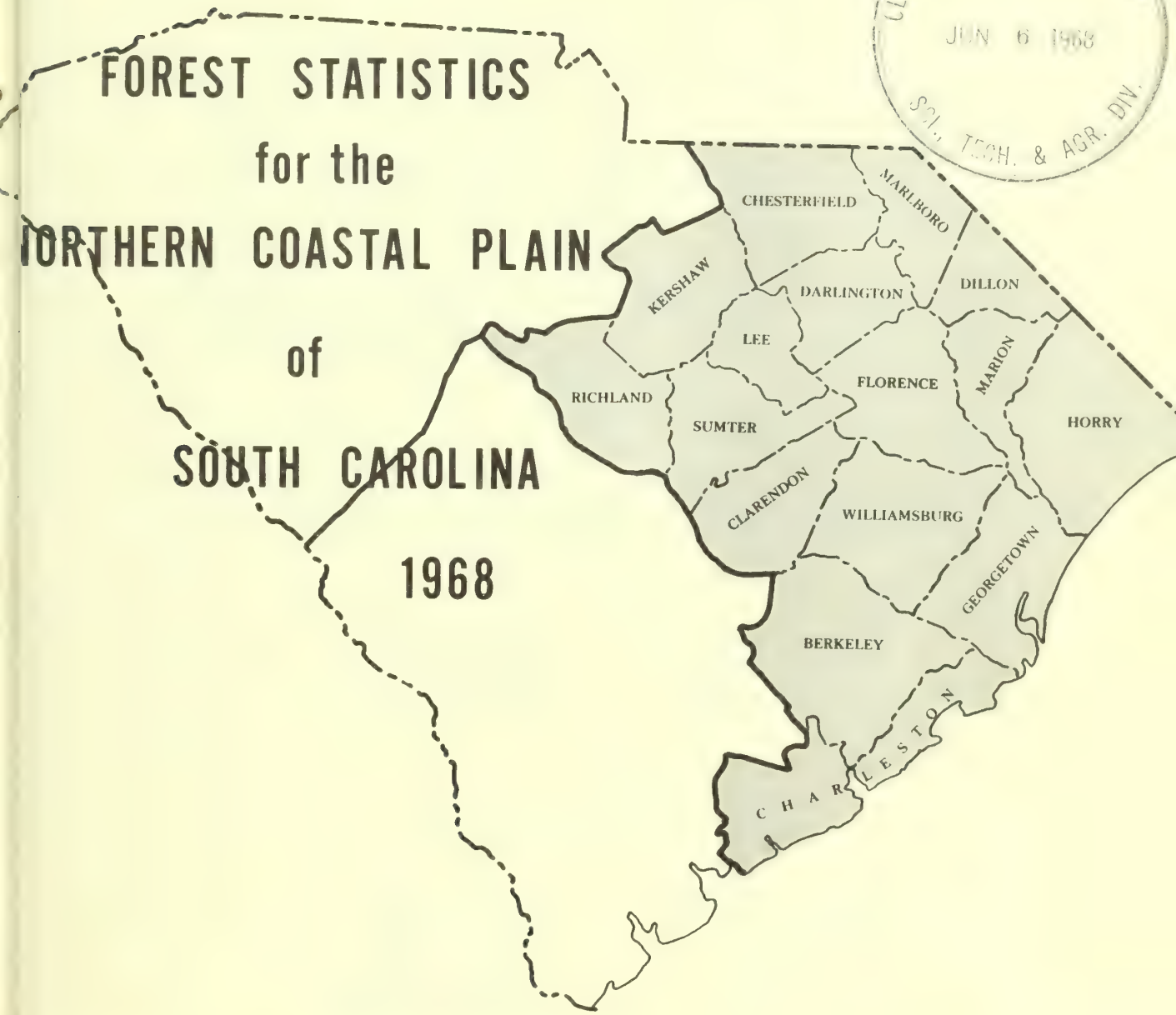
Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
			SAWTIMBER (in million board feet)								
Softwood	1947	4,304.9	--	--	1,246.2	1,187.3	761.3	526.1	244.2	130.5	209.3
	1958	4,128.6	--	--	1,236.9	1,060.8	693.0	485.3	256.3	177.9	218.4
	1967	5,320.6	--	--	1,462.0	1,381.4	1,063.8	635.2	352.2	196.7	229.3
Hardwood	1947	2,880.8	--	--	--	532.5	656.5	548.9	418.6	227.9	496.4
	1958	3,052.9	--	--	--	703.1	677.2	554.7	437.4	256.7	423.8
	1967	3,560.3	--	--	--	773.5	788.7	670.4	511.6	307.4	508.7
			GROWING STOCK (in million cubic feet)								
Softwood	1947	1,638.8	264.4	321.6	341.7	288.2	175.3	118.2	53.4	29.2	46.8
	1958	1,615.4	262.6	342.8	339.1	257.5	159.6	109.1	56.1	39.8	48.8
	1967	1,985.5	290.9	398.3	400.9	335.4	245.0	142.7	77.1	44.0	51.2
Hardwood	1947	1,245.9	103.8	147.7	164.8	176.0	188.6	147.7	116.6	62.5	138.2
	1958	1,381.7	119.5	177.8	198.0	232.4	194.5	149.3	121.8	70.4	118.0
	1967	1,642.5	143.3	229.9	238.3	255.6	226.6	180.4	142.5	84.3	141.6
			ALL LIVE TIMBER (in million cubic feet)								
Softwood	1947	1,708.2	290.0	342.6	356.1	293.8	176.1	118.7	53.7	29.7	47.5
	1958	1,685.5	288.0	365.2	353.4	262.5	160.4	109.5	56.4	40.5	49.6
	1967	2,066.6	319.0	424.2	418.1	341.7	246.1	143.3	77.5	44.7	52.0
Hardwood	1947	1,622.9	175.9	207.4	225.4	222.9	226.6	169.0	132.7	74.2	188.8
	1958	1,805.5	202.5	249.8	270.8	294.3	233.8	170.8	138.6	83.6	161.3
	1967	2,150.9	243.6	323.1	325.9	323.7	272.3	206.5	162.1	100.1	193.6

1/ To provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in previous surveys.

U. S. Forest Service Resource Bulletin SE-10 May 1968

CLEMSON UNIVERSITY LIBRARY
JUN 6 1968
SCI., TECH. & AGR. DIV.

FOREST STATISTICS for the NORTHERN COASTAL PLAIN of SOUTH CAROLINA 1968



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SOUTHEASTERN FOREST EXPERIMENT STATION
ASHEVILLE, NORTH CAROLINA

FOREWORD

This report highlights the principal findings of the fourth Forest Survey in the Northern Coastal Plain of South Carolina, completed in February 1968. Findings of the three earlier surveys, completed in 1936, 1947, and 1958, provide the basis for measuring the changes that have occurred and the trends that have developed over the past 30 years.

Forest Survey, authorized by the McSweeney-McNary Forest Research Act of May 22, 1928, as amended, is a continuing nationwide undertaking by the regional experiment stations of the U. S. Forest Service. In Florida, Georgia, North Carolina, South Carolina, and Virginia, Forest Survey is an activity of the Southeastern Forest Experiment Station, with headquarters at Asheville, North Carolina. The general objective is to inventory periodically forest lands, their extent, condition, and volume of timber, and to ascertain rates of forest growth and depletion. It is necessary to keep this basic information up to date to provide a sound basis for the formulation of forest policies and programs.

The 16-county area covered by this report is one of three Survey units in South Carolina. A comparable report, "Forest Statistics for the Piedmont of South Carolina 1967," U. S. Forest Service Resource Bulletin SE-9, was issued, and a similar report for the Southern Coastal Plain will be issued when the Statewide survey is completed.

Joe P. McClure, Project Leader, organized and coordinated the various phases of the Northern Coastal Plain survey. Noel D. Cost was in charge of data collection. William H. B. Haines supervised the aerial photo preparation and interpretation and the data computations. Richard L. Welch was responsible for compiling timber removal and mortality information. Herbert A. Knight was in charge of analysis and reporting.

Office personnel assisting in this report were:

Bertie W. Greene	Agnes C. Nichols
Cecil C. Hutchins, Jr.	Louise Shuford
Joanne Hutchison	Sammy S. Wenningham
Doniev W. Jackson	Dorothy S. White
Ruth E. McIntyre	Camilla E. Young

The field party included:

John D. Nesbit, Field Supervisor
Thomas R. Bellamy, Field Assistant

Robert A. Cathey	Bruce E. Mullin
Edgar L. Davenport	David L. Pait
Jeffrey E. Dukes	John F. Parlier, Jr.
Leonard G. Edwards	Douglas R. Phillips
Roy C. Henson	Nolan L. Snyder
Joseph D. Lloyd	Harry J. Van Loock III
Harold D. Mathews	Lawrence C. Wilson

Walton R. Smith

WALTON R. SMITH, Assistant Director
Division of Marketing, Utilization,
and Resources Research

FOREST STATISTICS
for the
NORTHERN COASTAL PLAIN of SOUTH CAROLINA
1968

by

RICHARD L. WELCH, ASSOCIATE RESOURCE ANALYST

CONTENTS

Page

HIGHLIGHTS - 1

HOW THE FOREST SURVEY IS MADE - - - - - - - - - - - - - - - - - - 3

RELIABILITY OF THE DATA - 4

DEFINITION OF TERMS - 5

COUNTY TABLES:

1. Area, by land class - 13
2. Area of commercial forest land, by ownership class - - - - - 14
3. Area of commercial forest land, by forest type group - - - - 15
4. Area of commercial forest land, by stand-size class - - - - 16
5. Area of commercial forest land, by site class - - - - - - - 17
6. Area of commercial forest land, by stocking classes of growing-stock trees - 18
7. Volume of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - - - - 19
8. Net annual growth of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - 20
9. Annual removals of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - 21

UNIT TABLES:

10. Area of commercial forest land, by forest type and ownership class - 22
11. Area of commercial forest land, by ownership and stocking classes of growing-stock trees - - - - - - - - - - - - - - - 22
12. Volume of timber on commercial forest land, by class and species group - 23
13. Number of growing-stock trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - 24
14. Volume of all live trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - 25
15. Volume of growing stock on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - 26
16. Volume of sawtimber on commercial forest land, by species and diameter class - 27
17. Net annual growth and removals of growing stock on commercial forest land, by species - - - - - - - - - - - - - - 28
18. Net annual growth and removals of sawtimber on commercial forest land, by species - - - - - - - - - - - - - - - - - - 29
19. Annual mortality of growing stock and sawtimber on commercial forest land, by species - - - - - - - - - - - - - - - 30
20. Volume of all live trees and growing stock on commercial forest land, by ownership class and species group - - - - - 31
21. Volume of sawtimber on commercial forest land, by ownership class and species group - - - - - - - - - - - - - - - - 31
22. Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group - - 32
23. Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group - - - - - 32
24. Average net volume per acre of sawtimber, growing stock, and cull timber on commercial forest land, by ownership class, major forest type, and species group - - - - - - - - 33
25. Land area, by class, major forest type, and survey completion date - 34
26. Volume of sawtimber, growing stock, and all timber on commercial forest land, by species group, diameter class, and survey completion date - - - - - - - - - - - - - - - - - - - 35

HIGHLIGHTS

Since 1958 in the Northern Coastal Plain of South Carolina--

--the addition of 206,300 acres of commercial forest land barely replaced the diversion of 195,100 acres of commercial forest to other land uses; however, the downward trend in forest area between 1947 and 1958 has been stopped. Most of the diversion was to agricultural uses, but over one-third of the loss was to urban development. Area of commercial forest land totals almost 4.7 million acres, or 63 percent of the total land area.

--area in pine and oak-pine cover types has increased about 7 percent and now makes up 57 percent of the commercial forest. In contrast, the area in hardwood cover types has decreased almost 8 percent. Loblolly pine, with almost 1.1 million acres, is the leading cover type, followed closely by oak-gum-cypress, which also occupies slightly over 1.0 million acres.

--forest industries have increased their holdings of commercial forest land by almost 300,000 acres, or 38 percent. Area of commercial forest land owned by farm operators decreased by over 360,000 acres, or 15 percent, and although this is a substantial reduction, it is much smaller than the decline in farmer-owned forest land found in the Piedmont of South Carolina. Miscellaneous private holdings are up 96,000 acres, or 10 percent, and public holdings are down slightly. Collectively, farmers and miscellaneous private owners still own over 3.1 million acres, or more than two-thirds of the commercial forest.

--sawtimber stands have increased by 119,300 acres, and poletimber stands have decreased by almost 139,000 acres. The trends also show more sapling and seedling stands and less area of nonstocked forest land. Almost half of the stands under 10 years of age originated from artificial planting or seeding.

--average stand density of all live trees 5.0 inches d.b.h. and larger expressed in basal area per acre has increased from 53 to 63 square feet. Still, less than 20 percent of the stands are fully stocked with growing-stock trees, and over one-fourth of the stands are very poorly stocked. This indicates that the current net growth, which averages about 59 cubic feet per acre annually, could be increased substantially.

--volume of softwood growing stock, primarily pine, increased from 2.1 to 2.6 billion cubic feet, or over 24 percent, reversing a downward trend in softwood volume between 1947 and 1958. There were gains in all diameter classes, and loblolly pine accounted for over 60 percent of the increase.

--volume of hardwood growing stock increased from 2.4 to over 2.7 billion cubic feet, or over 12 percent, which also reversed a downward trend in hardwood volume between 1947 and 1958. Gains were measured in all diameter classes; but collectively, laurel oak, water oak, and willow oak accounted for around 40 percent of the increase. About one-third of the increase was in blackgum, sweetgum, and tupelo, which are the leading hardwood species in the area in terms of volume.

In 1967--

--net growth of growing stock exceeded removals by 93.3 million cubic feet, or 51 percent. Over half of this growth over removal was pine and about 22 percent was oak. The soft-textured hardwoods accounted for less than 15 percent of the surplus growth. By ownership, 68 percent of the excess growth was on farmer and miscellaneous private holdings, 18 percent on public holdings, and the remaining 14 percent on forest industry lands.

--net growth of sawtimber exceeded removals by over 300 million board feet, or 46 percent. Two-thirds of this growth over removal was pine and about 18 percent was oak. The soft-textured hardwoods accounted for less than 10 percent of the surplus growth. By ownership, 66 percent of the excess growth was on farmer and miscellaneous private holdings, 21 percent on public holdings, and the remaining 13 percent on forest industry lands.

--mortality of growing stock totaled 26.6 million cubic feet, which tended to reduce gross growth by almost 10 percent. Over half of the mortality was hardwood, and suppression and climatic factors seemed to be the leading causes of death.

HOW THE FOREST SURVEY IS MADE

The method of survey is essentially a sampling procedure designed to provide reliable statistics primarily at the State and Survey Unit levels. Individual county statistics are presented to permit adding any combination of counties together until the total is large enough to meet the desired degree of reliability. The basic steps of the survey procedure were as follows:

1. Initial estimates of forest and nonforest areas were based on the classification of 38,432 sample points systematically spaced on the latest aerial photographs available.

2. The initial estimates of area by land-use class were either verified or adjusted on the basis of a ground check at 3,130 of these sample points.

3. Estimates of timber volume and forest classifications were based on measurements recorded at 2,022 of the ground check locations which fell within commercial forest land. A 10-point cluster of plots systematically spaced on an acre were measured at each of these sample locations using a basal area factor of 37.5 square feet per acre. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

4. Equations prepared from detailed measurements collected on the trees tallied at one out of every 20 sample locations were used to compute the volumes of individual tally trees. A mirror caliper and sectional aluminum poles were used to obtain the additional measurements on standing trees required to construct the volume equations. The same 5-percent subsample of plots used for the tree-volume study also served as a quality control of field measurements. Felled trees were measured at active cutting operations to provide utilization factors for product and species groups and to supplement the standing tree-volume study.

5. Permanent sample plots established in 1957 and 1958 were reconstructed where possible, and their remeasurement provided the primary estimates of growth, removal, and mortality.

6. Ownership information was collected from local contacts, correspondence, and public records. In those counties where the sample missed a particular ownership class, temporary sample plots were added and measured to describe the forest conditions within the ownership class.

7. All field data were sent to Asheville for editing and were punched in cards and stored on magnetic tape for machine computing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

RELIABILITY OF THE DATA

Statistical analysis of these data indicates a sampling error of ±0.7 percent for the estimate of total commercial forest area, 2.1 percent for total cubic volume, and 1.8 percent for cubic growth. As these totals are broken down by county, forest type, species, tree diameter, and other subdivisions, the sampling error increases. The order of this increase is suggested in the following tabulation which shows the sampling error to which the estimates are liable, in terms of one standard error.

Forest area	Sampling error[1]	Cubic volume	Sampling error[1]	Net cu.-ft. growth	Sampling error[1]
Thousand acres	Percent	Million cu. ft.	Percent	Million cu. ft.	Percent
4,687.4	0.7				
2,296.8	1.0			274.6	1.8
574.2	2.0	5,341.2	2.1	222.4	2.0
255.2	3.0	2,617.2	3.0	98.9	3.0
143.6	4.0	1,472.2	4.0	55.6	4.0
91.9	5.0	942.2	5.0	35.6	5.0
23.0	10.0	235.5	10.0	8.9	10.0
10.2	15.0	104.7	15.0	4.0	15.0
5.7	20.0	58.9	20.0	2.2	20.0
3.7	25.0	37.7	25.0	1.4	25.0

1/ By random-sampling formula.

DEFINITIONS OF TERMS

Acceptable trees.--Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.

Basal area.--The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand usually expressed as square feet of basal area per acre.

Commercial forest land.--Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

Commercial species.--Tree species presently or prospectively suitable for industrial wood products.

Cropland.--Land under cultivation within the past 24 months, including orchards and land in soil-improving crops, but excluding land cultivated in developing improved pasture. Also includes idle farmland.

Desirable trees.--Growing-stock trees of commercial species having no serious defects in quality limiting present or prospective use for timber products, of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age.

Diameter class.--A classification of trees based on diameter outside bark, measured at breast height ($4\frac{1}{2}$ feet above the ground). D.b.h. is the common abbreviation for "diameter at breast height." Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h., inclusive.

Farm.--Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totaled $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for the year amounted to at least $250.

Farm operator.--A person who operates a farm, either doing the work himself or directly supervising the work.

Farmer-owned lands.--Lands owned by farm operators.

Forest industry lands.--Lands owned by companies or individuals operating wood-using plants.

Forest land.--Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest type.--A classification of forest land based upon the species forming a plurality of live-tree stocking.

White pine-hemlock.--Forests in which eastern white pine or hemlock, singly or in combination, comprises a plurality of the stocking. (Common associates include birch and maple.)

Longleaf-slash pine.--Forests in which longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Loblolly-shortleaf pine.--Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Oak-pine.--Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.--Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress.--Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprises a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood.--Forests in which elm, ash, or cottonwood, singly or in combination, comprises a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Gross growth.--Annual increase in net volume of trees in the absence of cutting and mortality.

Growing-stock trees.--Live trees of commercial species qualifying as desirable or acceptable trees.

Growing-stock volume.--Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs.

Hardwoods.--Dicotyledonous trees, usually broad-leaved and deciduous.

Soft hardwoods.--Soft-textured hardwoods such as boxelder, red and silver maple, buckeye, hackberry, loblolly-bay, silverbell (in mts.), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm.

Hard hardwoods.--Hard-textured hardwoods such as Florida and sugar maple, birch, hickory, dogwood, persimmon (forest grown), beech, ash, honeylocust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Idle farmland.--Includes former croplands, orchards, improved pastures and farm sites not tended within the past two years, and presently less than 16.7 percent stocked with trees.

Improved pasture.--Land currently improved for grazing by cultivation, seeding, irrigation, or clearing of trees or brush.

Industrial wood.--All roundwood products except fuelwood.

Land area.

Bureau of the Census.--The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area.

Forest Survey.--The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet, and minimum size of lakes, etc., is 1 acre.

Logging residues.--The unused portions of trees cut or killed by logging.

Miscellaneous Federal lands.--Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

Miscellaneous private lands - corporate.--Lands owned by private corporations other than forest industry.

Miscellaneous private lands - individual.--Privately owned lands other than forest-industry, farmer-owned, or corporate lands.

Mortality.--Number or sound-wood volume of live trees dying from natural causes during a specified period.

National Forest land.--Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Net annual growth.--The increase in volume of a specified size class for a specific year.

Net volume.--Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial forest land.--(a) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and (b) productive-reserved forest land.

Noncommercial species.--Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land.--Land that has never supported forests and lands formerly forested where use for timber management is precluded by development for other uses.

Nonstocked land.--Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Other Federal lands.--Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

Other public lands.--Publicly-owned lands other than National Forests.

Overstocked areas.--Areas where growth of trees is significantly reduced by excessive numbers of trees.

Poletimber trees.--Growing-stock trees of commercial species at least 5.0 inches in d.b.h. but smaller than sawtimber size.

Productive-reserved forest land.--Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation.

Rangeland.--Land on which the natural plant cover is composed principally of native grasses, forbs, or shrubs valuable for forage.

Rotten trees.--Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively and/or do not meet Regional specifications for freedom from defect primarily because of rot.

Rough trees.--(a) Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively and/or do not meet Regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Salvable dead trees.--Standing or down dead trees that are considered merchantable by Regional standards.

Saplings.--Live trees 1.0 inch to 5.0 inches in diameter at breast height.

Saw log.--A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, and with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods), or other combinations of size and defect specified by Regional standards.

Saw-log portion.--That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.--The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber trees.--Live trees of commercial species containing at least a 12-foot saw log and meeting Regional specifications for freedom from defect. Softwoods must be at least 9.0 inches and hardwoods at least 11.0 inches in diameter at breast height.

Sawtimber volume.--Net volume of the saw-log portion of live sawtimber in board-foot International 1/4-inch rule.

Seedlings.--Live trees less than 1.0 inch in diameter at breast height that are expected to survive according to Regional standards.

Site class.--A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Class 1.--Sites capable of producing 165 or more cubic feet per acre annually.

Class 2.--Sites capable of producing 120 to 165 cubic feet per acre annually.

Class 3.--Sites capable of producing 85 to 120 cubic feet per acre annually.

Class 4.--Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 5.--Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

Softwoods.--Coniferous trees, usually evergreen, having needles or scale-like leaves.

Pines.--Yellow pine species which include loblolly, longleaf, slash, shortleaf, pitch, Virginia, Table-Mt., sand, and spruce pine.

Other softwoods.--White pine, hemlock, cypress, eastern redcedar, white-cedar, spruce, and fir.

Stand-size class.--A classification of forest land based on the size class of growing-stock trees on the area.

Sawtimber stands.--Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to pole-timber stocking.

Poletimber stands.--Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.--Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and/or seedlings.

State, county, and municipal lands.--Lands owned by States, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Stocking.--The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand and spacing in the stand, compared to a minimum standard of 75 square feet of basal area per acre to fully utilize the growth potential of the land.

Timber removals.--The net volume of growing-stock trees removed from the inventory by harvesting; cultural operations, such as stand improvement; land clearing, or changes in land use.

Unproductive forest land.--Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

Upper-stem portion.--That part of the bole of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Urban and other areas.--Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

Water.

Bureau of the Census.--Streams, sloughs, estuaries, and canals more than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds more than 40 acres in area.

Forest Survey.--The same as Census except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

Conversion factors:

Cubic feet of wood per average cord (excluding bark)

D.b.h. class	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
6	60.3	60.9	67.7	59.8	59.5
8	68.3	68.1	76.3	68.2	68.2
10	73.4	73.0	81.3	73.3	73.2
12	76.7	76.5	85.2	76.3	76.3
14	79.1	79.3	88.0	78.3	78.3
16	80.9	81.5	90.3	79.7	79.7
18	82.2	83.2	92.2	80.7	80.7
20	83.2	84.7	93.6	81.5	81.5
22	84.3	86.7	96.1	82.5	82.6
24+	86.4	89.9	100.1	83.8	83.8
Average	76.0	75.7	88.3	75.4	75.6

COUNTY TABLES

The county tables are intended for use in compiling forest resource estimates for groups of counties. Because the sampling procedure used by the Forest Survey in the Northern Coastal Plain of South Carolina was intended primarily to furnish inventory data for the Unit as a whole, individual county estimates have limited and variable accuracy. As county totals are broken down by various subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the tabulation on page 4.

Table 1.--Area, by land class and county, 1968

County	All land[1]	Forest land				Nonforest land[2]
		Total	Commercial forest	Unproductive forest	Productive reserved	
	Thousand acres					
Berkeley	701.6	583.3	578.5	1.7	3.1	118.3
Charleston	604.8	307.2	302.0	--	5.2	297.6
Chesterfield	507.5	328.6	322.5	--	6.1	178.9
Clarendon	382.7	214.2	214.2	--	(3/)	168.5
Darlington	349.0	176.8	176.8	--	--	172.2
Dillon	260.5	136.5	135.6	0.6	0.3	124.0
Florence	515.2	274.9	274.9	--	(3/)	240.3
Georgetown	520.3	391.3	388.8	--	2.5	129.0
Horry	737.3	494.5	486.1	8.1	0.3	242.8
Kershaw	503.1	381.1	381.1	--	--	122.0
Lee	261.8	106.5	105.7	--	0.8	155.3
Marion	312.3	210.1	210.1	--	--	102.2
Marlboro	308.5	158.1	158.1	--	--	150.4
Richland	478.7	340.5	340.2	--	0.3	138.2
Sumter	441.0	226.1	225.7	--	0.4	214.9
Williamsburg	598.4	387.1	387.1	--	--	211.3
Total	7,482.7	4,716.8	4,687.4	10.4	19.0	2,765.9

1/ From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

2/ Includes 76,900 acres of water according to Survey standards of area classification but defined by Bureau of the Census as land.

3/ Less than 50 acres.

Table 2.--Area of commercial forest land, by ownership class and county, 1968

County	All ownerships	Ownership class							
		National Forest	Miscellaneous Federal	State	County and municipal	Forest industry 1/	Farmer	Miscellaneous private	
								Corporate	Individual
	Thousand acres								
Berkeley	578.5	154.5	8.6	14.3	0.6	165.5	71.9	11.0	152.1
Charleston	302.0	68.3	1.4	1.0	2.0	73.7	49.8	--	105.8
Chesterfield	322.5	--	--	84.1	0.2	21.3	164.2	4.2	48.5
Clarendon	214.2	--	0.3	4.3	0.3	42.8	131.0	8.9	26.6
Darlington	176.8	--	--	0.9	0.1	28.6	120.2	2.5	24.5
Dillon	135.6	--	--	0.5	(2/)	27.2	103.0	--	4.9
Florence	274.9	--	--	0.1	0.2	37.1	216.1	--	21.4
Georgetown	388.8	--	--	0.1	0.3	235.2	54.4	2.0	96.8
Horry	486.1	--	3.4	0.6	0.1	129.9	313.0	--	39.1
Kershaw	381.1	--	--	0.7	3.2	55.0	136.6	10.3	175.3
Lee	105.7	--	--	2.0	--	0.9	88.5	--	14.3
Marion	210.1	--	--	--	(2/)	84.9	89.8	--	35.4
Marlboro	158.1	--	--	0.1	0.1	45.6	98.3	--	14.0
Richland	340.2	--	48.5	5.5	0.3	26.0	99.9	4.5	155.5
Sumter	225.7	--	--	43.6	0.4	28.6	129.7	--	23.4
Williamsburg	387.1	--	--	--	0.1	69.2	260.0	--	57.8
Total	4,687.4	222.8	62.2	157.8	7.9	1,071.5	2,126.4	43.4	995.4

1/ Not including 4,800 acres of farmer and miscellaneous private lands leased to forest industry.
2/ Less than 50 acres.

Table 3.--Area of commercial forest land, by forest-type group and county, 1968

County	All type groups	Forest-type groups						
		White pine-hemlock	Longleaf-slash pine	Loblolly-shortleaf pine	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood
	Thousand acres							
Berkeley	578.5	--	62.3	221.9	83.1	81.2	120.7	9.3
Charleston	302.0	--	21.5	121.8	71.4	35.0	52.3	--
Chesterfield	322.5	--	89.5	56.5	56.0	91.0	19.0	10.5
Clarendon	214.2	--	29.4	44.9	30.1	33.3	76.5	--
Darlington	176.8	--	19.8	42.6	32.1	50.5	29.3	2.5
Dillon	135.6	--	2.1	24.5	19.6	43.1	43.9	2.4
Florence	274.9	--	14.2	92.7	60.9	27.7	79.4	--
Georgetown	388.8	--	29.6	133.7	62.6	49.8	113.1	--
Horry	486.1	--	20.6	159.8	92.8	107.8	102.7	2.4
Kershaw	381.1	--	56.2	120.2	80.1	77.2	23.0	24.4
Lee	105.7	--	7.6	29.2	16.7	31.1	16.7	4.4
Marion	210.1	--	1.8	49.4	38.7	33.8	76.5	9.9
Marlboro	158.1	--	16.1	22.3	18.2	53.9	32.7	14.9
Richland	340.2	--	37.2	111.8	66.9	59.6	58.0	6.7
Sumter	225.7	--	24.8	54.8	23.3	46.8	65.7	10.3
Williamsburg	387.1	--	27.1	101.5	73.9	83.3	101.3	--
Total	4,687.4	--	459.8	1,387.6	826.4	905.1	1,010.8	97.7

Table 4.--Area of commercial forest land, by stand-size class and county, 1968

County	All stands	Stand-size class			Nonstocked areas
		Sawtimber	Poletimber	Sapling and seedling	
	Thousand acres				
Berkeley	578.5	312.2	114.9	130.9	20.5
Charleston	302.0	182.0	64.8	51.3	3.9
Chesterfield	322.5	109.8	75.5	107.3	29.9
Clarendon	214.2	96.2	39.8	73.4	4.8
Darlington	176.8	88.6	39.4	46.4	2.4
Dillon	135.6	81.8	30.4	21.0	2.4
Florence	274.9	168.4	40.3	66.2	--
Georgetown	388.8	193.5	96.3	78.4	20.6
Horry	486.1	244.4	117.8	112.4	11.5
Kershaw	381.1	112.8	88.1	157.0	23.2
Lee	105.7	37.9	26.3	41.5	--
Marion	210.1	128.6	37.4	36.8	7.3
Marlboro	158.1	59.1	51.2	41.3	6.5
Richland	340.2	135.4	85.3	107.0	12.5
Sumter	225.7	122.3	35.9	67.5	--
Williamsburg	387.1	202.5	85.5	94.8	4.3
Total	4,687.4	2,275.5	1,028.9	1,233.2	149.8

Table 5.--Area of commercial forest land, by site class and county, 1968

County	All classes	Site class				
		1	2	3	4	5
	Thousand acres					
Berkeley	578.5	--	17.9	167.6	297.1	95.9
Charleston	302.0	--	18.1	86.9	149.9	47.1
Chesterfield	322.5	--	--	23.2	161.0	138.3
Clarendon	214.2	--	2.2	37.4	124.9	49.7
Darlington	176.8	--	4.2	58.1	81.7	32.8
Dillon	135.6	--	4.9	38.9	62.8	29.0
Florence	274.9	--	7.1	92.1	127.2	48.5
Georgetown	388.8	--	26.1	130.6	162.8	69.3
Horry	486.1	--	2.5	83.8	290.2	109.6
Kershaw	381.1	--	7.7	40.4	218.7	114.3
Lee	105.7	--	4.4	14.3	57.4	29.6
Marion	210.1	--	--	73.1	94.2	42.8
Marlboro	158.1	--	4.1	27.6	95.1	31.3
Richland	340.2	--	2.2	61.5	193.3	83.2
Sumter	225.7	--	6.3	78.4	118.0	23.0
Williamsburg	387.1	--	21.0	105.5	205.1	55.5
Total	4,687.4	--	128.7	1,119.4	2,439.4	999.9

Table 6.--Area of commercial forest land, by stocking classes of growing-stock trees, by county, 1968

County	All classes	Stocking percentage[1/]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
Berkeley	578.5	6.6	107.4	318.8	125.2	20.5
Charleston	302.0	5.4	63.8	166.6	62.3	3.9
Chesterfield	322.5	4.2	27.0	141.2	120.2	29.9
Clarendon	214.2	10.7	38.1	123.9	36.7	4.8
Darlington	176.8	2.7	19.1	105.6	47.0	2.4
Dillon	135.6	--	18.9	84.9	29.4	2.4
Florence	274.9	3.4	45.2	172.3	54.0	--
Georgetown	388.8	10.8	86.4	216.8	54.2	20.6
Horry	486.1	21.4	73.0	272.4	107.8	11.5
Kershaw	381.1	5.2	52.5	172.2	128.0	23.2
Lee	105.7	--	7.2	50.7	47.8	--
Marion	210.1	6.5	37.6	109.8	48.9	7.3
Marlboro	158.1	--	24.9	101.5	25.2	6.5
Richland	340.2	--	52.9	178.7	96.1	12.5
Sumter	225.7	2.1	39.7	141.8	42.1	--
Williamsburg	387.1	2.6	46.2	241.8	92.2	4.3
Total	4,687.4	81.6	739.9	2,599.0	1,117.1	149.8

1/ Stocking percentage is based on a standard of 75 square feet per acre.

Table 7.--Volume of sawtimber and growing stock on commercial forest land, by species group and county, 1968

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet[1/]				
Berkeley	2,326.7	1,404.1	120.1	446.9	355.6	717.0	388.4	34.5	168.2	125.9
Charleston	1,100.5	719.3	60.9	205.9	114.4	362.7	208.6	17.2	85.8	51.1
Chesterfield	612.6	362.1	--	160.4	90.1	210.0	114.1	0.3	56.8	38.8
Clarendon	929.9	277.2	107.0	349.0	196.7	317.2	82.4	27.6	130.4	76.8
Darlington	678.9	359.0	44.9	160.6	114.4	205.1	92.5	11.3	58.0	43.3
Dillon	509.0	230.3	33.7	175.4	69.6	168.3	59.3	8.2	70.9	29.9
Florence	1,297.7	720.6	91.9	319.7	165.5	387.5	189.3	25.9	112.2	60.1
Georgetown	1,616.1	837.0	119.7	437.2	222.2	533.8	250.8	30.0	162.2	90.8
Horry	1,694.3	731.1	142.0	568.3	252.9	569.0	219.7	37.5	222.0	89.8
Kershaw	768.5	407.5	9.8	251.9	99.3	259.5	133.4	3.2	82.2	40.7
Lee	184.8	64.1	--	93.6	27.1	68.3	20.9	--	35.3	12.1
Marion	943.5	353.0	99.8	313.2	177.5	299.6	93.1	23.8	119.3	63.4
Marlboro	484.5	166.8	39.9	207.0	70.8	171.8	47.2	9.8	84.8	30.0
Richland	1,026.1	441.1	22.5	368.4	194.1	341.4	134.1	6.6	125.6	75.1
Sumter	955.5	418.8	46.9	365.9	123.9	289.6	114.9	11.4	120.3	43.0
Williamsburg	1,417.0	711.4	49.1	274.1	382.4	440.4	190.6	13.5	107.8	128.5
Total	16,545.6	8,203.4	988.2	4,697.5	2,656.5	5,341.2	2,339.3	260.8	1,741.8	999.3

1/ Factors for converting to cords are shown on page 11.

Table 8.--Net annual growth of sawtimber and growing stock on commercial forest land, by species group and county, 1967

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Berkeley	128.1	93.5	3.4	16.1	15.1	36.2	24.9	1.1	5.3	4.9
Charleston	77.0	58.3	2.4	9.6	6.7	20.6	14.6	0.4	3.0	2.6
Chesterfield	44.3	32.0	--	6.9	5.4	13.6	9.4	--	2.2	2.0
Clarendon	46.9	23.3	4.0	11.3	8.3	14.2	6.4	0.8	4.0	3.0
Darlington	36.2	21.6	1.1	8.2	5.3	10.5	5.9	0.2	2.3	2.1
Dillon	27.8	14.8	0.9	8.8	3.3	7.9	3.5	0.2	2.6	1.6
Florence	65.4	46.0	2.6	10.7	6.1	17.0	10.5	0.6	3.6	2.3
Georgetown	94.1	66.0	4.2	13.7	10.2	25.8	16.3	0.9	4.7	3.9
Horry	100.0	58.9	5.2	24.6	11.3	29.1	16.3	1.2	7.7	3.9
Kershaw	63.0	45.7	0.2	11.2	5.9	19.3	13.8	0.1	3.2	2.2
Lee	11.4	5.6	--	4.2	1.6	3.9	1.8	--	1.4	0.7
Marion	48.8	22.2	3.2	14.4	9.0	13.6	5.7	0.6	4.7	2.6
Marlboro	28.9	11.4	1.3	11.7	4.5	8.9	3.6	0.3	3.4	1.6
Richland	59.1	32.1	0.6	16.4	10.0	19.0	10.7	0.3	4.6	3.4
Sumter	48.4	26.9	1.6	14.7	5.2	14.0	7.8	0.4	3.9	1.9
Williamsburg	75.1	45.6	1.6	12.2	15.7	21.0	11.4	0.3	4.0	5.3
Total	954.5	603.9	32.3	194.7	123.6	274.6	162.6	7.4	60.6	44.0

Table 9.--Annual removals of sawtimber and growing stock on commercial forest land, by species group and county, 1967

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Berkeley	75.4	63.7	0.6	1.9	9.2	21.1	17.7	0.2	0.6	2.6
Charleston	46.7	36.8	--	7.4	2.5	12.5	9.2	--	2.2	1.1
Chesterfield	19.3	6.9	--	10.1	2.3	7.0	3.1	--	3.1	0.8
Clarendon	46.6	14.8	6.7	21.4	3.7	12.1	3.5	1.4	5.9	1.3
Darlington	16.5	7.8	--	6.3	2.4	4.3	1.8	--	1.6	0.9
Dillon	26.9	18.7	--	8.0	0.2	6.7	4.7	--	1.9	0.1
Florence	49.0	40.5	--	4.8	3.7	13.0	9.5	--	2.0	1.5
Georgetown	71.6	48.1	7.6	12.5	3.4	17.8	12.0	1.4	3.3	1.1
Horry	55.9	42.7	--	7.3	5.9	15.7	11.0	--	2.4	2.3
Kershaw	43.8	32.1	--	7.4	4.3	16.6	12.1	--	3.1	1.4
Lee	14.3	3.2	--	9.9	1.2	4.0	0.9	--	2.6	0.5
Marion	27.2	10.8	1.2	10.6	4.6	7.1	2.7	0.2	2.8	1.4
Marlboro	40.2	20.4	3.0	11.9	4.9	11.2	5.3	0.7	3.6	1.6
Richland	38.8	16.8	0.8	16.4	4.8	10.9	5.0	0.3	4.1	1.5
Sumter	34.0	11.7	1.5	16.2	4.6	8.6	3.0	0.4	3.8	1.4
Williamsburg	47.3	26.0	0.9	14.2	6.2	12.7	6.7	0.2	4.0	1.8
Total	653.5	401.0	22.3	166.3	63.9	181.3	108.2	4.8	47.0	21.3

Table 10.--Area of commercial forest land, by forest type and ownership class, 1968

Forest type	All ownerships	Ownership class				
		National Forest	Other public	Forest industry	Farmer	Misc. private
	Thousand acres					
Softwood types:						
White pine-hemlock	--	--	--	--	--	--
Longleaf pine	249.2	31.5	56.1	62.3	61.4	37.9
Slash pine	210.6	2.2	37.1	53.7	62.0	55.6
Loblolly pine[1/]	1,078.8	85.6	33.1	261.4	471.1	227.6
Shortleaf pine	33.7	2.2	4.0	4.9	8.7	13.9
Virginia pine	--	--	--	--	--	--
Redcedar	13.0	--	--	--	2.2	10.8
Pond pine	262.1	17.4	16.8	83.4	86.1	58.4
Pitch pine	--	--	--	--	--	--
Total	1,847.4	138.9	147.1	465.7	691.5	404.2
Hardwood types:						
Oak-pine	826.4	34.2	29.3	138.3	436.3	188.3
Oak-hickory	806.0	11.1	15.1	141.2	487.7	150.9
Southern scrub oak	99.1	--	15.0	11.1	44.2	28.8
Oak-gum-cypress	1,010.8	36.4	13.9	301.2	427.3	232.0
Elm-ash-cottonwood	97.7	2.2	7.5	14.0	39.4	34.6
Total	2,840.0	83.9	80.8	605.8	1,434.9	634.6
All types	4,687.4	222.8	227.9	1,071.5	2,126.4	1,038.8

1/ Includes 3,600 acres of spruce pine type.

Table 11.--Area of commercial forest land, by ownership and stocking classes of growing-stock trees, 1968

Ownership classes	All classes	Stocking percentage[1/]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
National Forest	222.8	10.2	56.9	114.8	40.9	--
Other public	227.9	0.6	32.5	112.2	72.1	10.5
Forest industry	1,071.5	35.1	204.1	648.3	150.6	33.4
Farmer	2,126.4	24.0	300.2	1,180.4	561.0	60.8
Misc. private	1,038.8	11.7	146.2	543.3	292.5	45.1
All ownerships	4,687.4	81.6	739.9	2,599.0	1,117.1	149.8

1/ Stocking percentage is based on a standard of 75 square feet per acre.

Table 12.--Volume of timber on commercial forest land, by class and species group, 1968

Class of timber	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
			Million cubic feet		
Sawtimber trees:					
Saw-log portion	3,776.9	1,787.2	218.5	1,106.7	664.5
Upper-stem portion	341.7	99.3	20.0	147.0	75.4
Total	4,118.6	1,886.5	238.5	1,253.7	739.9
Poletimber trees	1,222.6	452.8	22.3	488.1	259.4
All growing-stock trees	5,341.2	2,339.3	260.8	1,741.8	999.3
Rough trees:					
Sawtimber-size trees	341.9	23.4	5.7	183.3	129.5
Poletimber-size trees	398.6	37.3	3.7	208.1	149.5
Total	740.5	60.7	9.4	391.4	279.0
Rotten trees:					
Sawtimber-size trees	212.1	1.1	17.9	132.0	61.1
Poletimber-size trees	22.9	0.4	0.3	16.6	5.6
Total	235.0	1.5	18.2	148.6	66.7
Salvable dead trees:					
Sawtimber-size trees	1.8	0.5	--	--	1.3
Poletimber-size trees	2.5	2.2	--	--	0.3
Total	4.3	2.7	--	--	1.6
Total, all timber	6,321.0	2,404.2	288.4	2,281.8	1,346.6

Table 13.--Number of growing-stock trees on commercial forest land, by species and diameter class, 1968

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees										
Softwood:											
Longleaf pine	36,700	12,329	8,764	7,430	4,466	2,370	946	274	75	44	2
Slash pine	16,485	13,374	2,045	768	175	89	13	21	--	--	--
Shortleaf pine	9,651	4,909	2,386	1,125	648	343	150	65	20	5	--
Loblolly pine	135,470	54,231	28,739	18,340	13,348	8,958	5,956	2,898	1,648	1,305	47
Virginia pine	159	48	96	15	--	--	--	--	--	--	--
Pond pine	35,583	15,195	8,665	5,443	3,388	1,537	828	355	117	55	--
Spruce pine	586	136	257	86	78	--	25	--	4	--	--
Cypress	12,348	3,082	2,321	2,038	1,688	1,267	806	519	277	287	63
Other eastern softwoods	1,294	1,095	69	48	11	27	12	11	12	9	--
Total softwoods	248,276	104,399	53,342	35,293	23,802	14,591	8,736	4,143	2,153	1,705	112
Hardwood:											
Select white oaks[1]	6,496	1,884	1,597	1,027	727	575	275	189	93	112	17
Select red oaks[2]	2,315	509	524	340	292	262	144	86	52	100	6
Other white oaks	6,855	3,207	1,401	795	407	344	206	142	129	162	62
Other red oaks	40,288	17,885	8,529	4,802	3,340	1,862	1,359	911	575	890	135
Hickory	6,031	2,275	1,151	768	607	489	286	184	112	148	11
Hard maple	152	117	--	16	10	9	--	--	--	--	--
Soft maple	15,173	6,590	3,561	1,808	1,087	859	565	343	184	170	6
Beech	150	96	--	--	22	8	6	15	--	3	--
Sweetgum	48,408	21,194	11,374	5,929	3,897	2,678	1,497	860	490	439	50
Tupelo and blackgum	50,937	14,246	10,834	8,325	6,695	5,048	2,962	1,521	684	580	42
Ash	8,109	3,476	1,633	1,307	755	384	270	138	52	94	--
Cottonwood	2,017	798	350	371	192	167	76	33	8	20	2
Basswood	12	--	--	--	12	--	--	--	--	--	--
Yellow-poplar	5,492	1,697	1,141	894	638	379	373	208	84	73	5
Black walnut	57	--	43	14	--	--	--	--	--	--	--
Black cherry	437	350	77	--	10	--	--	--	--	--	--
Elm	4,148	1,869	751	643	312	226	138	85	45	71	8
Sycamore	438	37	149	33	78	18	37	26	24	36	--
Birch (except yellow)	1,271	437	254	234	146	97	55	25	20	3	--
Other eastern hardwoods	4,921	2,384	1,093	665	402	175	84	64	36	13	5
Total hardwoods	203,707	79,051	44,462	27,971	19,629	13,580	8,333	4,830	2,588	2,914	349
All species	451,983	183,450	97,804	63,264	43,431	28,171	17,069	8,973	4,741	4,619	461

[1] Includes white, swamp white, and swamp chestnut oaks.
[2] Includes cherrybark, northern red, and Shumard oaks.

Table 14.--Volume of all live trees on commercial forest land, by species and diameter class, 1968

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	374.0	28.3	52.1	84.9	83.0	65.5	36.2	14.1	5.0	4.6	0.3
Slash pine	46.4	20.6	10.0	7.5	3.3	3.3	0.5	1.2	--	--	--
Shortleaf pine	68.5	9.6	13.3	11.9	12.3	9.7	6.0	3.6	1.5	0.6	--
Loblolly pine	1,628.5	113.5	164.7	201.8	243.6	250.6	233.4	157.9	116.7	136.6	9.7
Virginia pine	0.8	--	0.6	0.2	--	--	--	--	--	--	--
Pond pine	277.1	31.4	43.8	52.9	54.0	38.3	28.5	16.6	7.1	4.5	--
Spruce pine	6.2	0.5	2.1	0.9	1.4	0.2	0.9	--	0.2	--	--
Cypress	279.6	6.7	15.9	27.7	37.2	42.1	35.0	31.1	22.1	36.2	25.6
Other eastern softwoods	8.8	2.7	1.0	0.7	0.5	0.7	0.4	0.6	0.9	1.3	--
Total softwoods	2,689.9	213.3	303.5	388.5	435.3	410.4	340.9	225.1	153.5	183.8	35.6
Hardwood:											
Select white oaks[1/]	105.2	5.7	10.7	12.4	13.6	17.0	11.3	10.7	6.8	12.1	4.9
Select red oaks[2/]	46.8	1.6	3.2	4.4	5.2	6.2	5.3	4.4	3.5	11.5	1.5
Other white oaks	139.4	10.0	12.5	11.4	11.2	12.8	11.9	9.8	11.1	27.5	21.2
Other red oaks	687.9	53.6	62.8	69.8	79.8	66.4	67.4	60.9	52.7	127.4	47.1
Hickory	113.8	5.6	8.5	9.6	13.9	14.9	14.0	12.4	10.1	20.5	4.3
Hard maple	1.6	0.2	0.3	0.4	0.4	0.2	0.1	--	--	--	--
Soft maple	324.0	31.8	42.6	41.0	40.6	43.5	36.4	28.3	22.1	31.0	6.7
Beech	6.2	0.3	0.3	0.1	0.9	0.9	0.5	1.2	0.1	1.3	0.6
Sweetgum	655.3	57.7	80.6	84.3	97.3	95.4	71.2	55.3	41.2	57.2	15.1
Tupelo and blackgum	1,025.0	49.4	93.5	138.4	172.8	178.9	141.8	100.9	56.9	74.9	17.5
Ash	136.2	14.8	18.7	23.5	21.7	16.2	13.1	9.4	4.6	13.5	0.7
Cottonwood	30.8	2.5	2.6	5.4	4.8	5.5	3.5	2.1	0.6	2.4	1.4
Basswood	0.4	0.1	0.1	--	0.2	--	--	--	--	--	--
Yellow-poplar	97.9	4.9	7.3	13.4	14.4	12.7	15.8	12.0	6.6	8.8	2.0
Black walnut	1.5	--	0.9	0.2	--	--	0.1	0.1	0.2	--	--
Black cherry	6.2	2.6	1.5	0.5	0.6	0.3	--	--	--	0.7	--
Elm	74.4	6.7	7.2	10.4	9.6	8.5	7.2	6.9	4.3	10.9	2.7
Sycamore	14.8	0.2	0.9	0.7	1.9	1.2	1.9	1.8	1.8	4.4	--
Birch (except yellow)	22.8	1.7	2.9	3.9	4.8	3.2	2.3	1.6	1.8	0.6	--
Other eastern hardwoods	136.6	35.7	30.3	25.0	17.8	10.2	5.3	5.1	3.2	2.9	1.1
Total hardwoods	3,626.8	285.1	387.4	454.8	511.5	494.0	409.1	322.9	227.6	407.6	126.8
All species	6,316.7	498.4	690.9	843.3	946.8	904.4	750.0	548.0	381.1	591.4	162.4

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark, northern red, and Shumard oaks.

Table 15.--Volume of growing stock on commercial forest land, by species and diameter class, 1968

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	371.7	27.5	51.5	84.6	82.8	65.3	36.0	14.0	5.0	4.7	0.3
Slash pine	44.3	19.2	9.5	7.3	3.3	3.3	0.5	1.2	--	--	--
Shortleaf pine	67.2	9.2	12.9	11.7	12.1	9.6	6.0	3.6	1.5	0.6	--
Loblolly pine	1,584.8	101.0	151.2	191.5	239.5	249.2	233.1	157.4	116.6	135.6	9.7
Virginia pine	0.8	--	0.6	0.2	--	--	--	--	--	--	--
Pond pine	265.7	28.0	40.6	50.4	53.2	37.6	28.3	16.3	6.9	4.4	--
Spruce pine	4.8	0.3	1.3	0.7	1.4	--	0.9	--	0.2	--	--
Cypress	253.6	5.8	13.7	25.0	35.2	41.3	34.4	29.9	21.3	31.9	15.1
Other eastern softwoods	7.2	2.4	0.4	0.7	0.3	0.7	0.4	0.5	0.9	0.9	--
Total softwoods	2,600.1	193.4	281.7	372.1	427.8	407.0	339.6	222.9	152.4	178.1	25.1
Hardwood:											
Select white oaks[1/]	93.9	4.2	9.0	10.9	12.5	15.6	10.4	9.9	6.0	11.5	3.9
Select red oaks[2/]	43.7	1.0	2.6	3.8	5.0	6.3	5.3	4.2	3.5	10.8	1.2
Other white oaks	93.0	6.2	6.8	6.9	6.4	8.4	7.3	6.6	8.2	20.0	16.2
Other red oaks	546.8	39.6	48.7	53.5	66.0	54.7	54.5	50.4	43.1	102.5	33.8
Hickory	94.3	4.1	5.7	7.5	10.2	14.0	11.9	11.0	8.4	18.4	3.1
Hard maple	0.9	0.3	--	0.2	0.2	0.2	--	--	--	--	--
Soft maple	187.4	16.2	22.4	22.9	22.1	26.8	23.4	19.8	13.8	18.9	1.1
Beech	2.2	0.1	--	--	0.5	0.2	0.3	0.8	--	0.3	--
Sweetgum	570.2	42.3	64.9	70.7	82.6	87.1	65.4	52.3	39.2	53.1	12.6
Tupelo and blackgum	765.7	28.3	60.1	98.0	130.0	148.0	117.8	81.2	45.2	49.6	7.5
Ash	96.0	7.8	10.8	16.6	15.7	11.5	11.0	8.7	3.7	10.2	--
Cottonwood	28.1	1.9	2.2	4.9	4.5	5.3	3.3	1.9	0.6	2.4	1.1
Basswood	0.2	--	--	--	0.2	--	--	--	--	--	--
Yellow-poplar	87.8	4.3	6.6	11.5	13.4	10.7	15.4	11.6	6.0	7.2	1.1
Black walnut	0.7	--	0.5	0.2	--	--	--	--	--	--	--
Black cherry	1.6	0.9	0.5	--	0.2	--	--	--	--	--	--
Elm	57.2	4.7	4.2	8.0	6.6	7.0	5.9	5.5	3.3	9.5	2.5
Sycamore	12.6	0.1	1.0	0.5	1.5	0.5	1.9	1.6	1.6	3.9	--
Birch (except yellow)	16.7	0.8	1.7	2.9	3.1	2.9	2.3	1.1	1.6	0.3	--
Other eastern hardwoods	42.1	4.8	6.3	6.9	7.8	4.6	3.2	3.4	2.5	1.7	0.9
Total hardwoods	2,741.1	167.6	254.0	325.9	388.5	403.8	339.3	270.0	186.7	320.3	85.0
All species	5,341.2	361.0	535.7	698.0	816.3	810.8	678.9	492.9	339.1	498.4	110.1

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark, northern red, and Shumard oaks.

Table 16.--Volume of sawtimber on commercial forest land, by species and diameter class, 1968

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	1,323.4	351.4	377.7	307.3	173.3	67.4	23.1	21.7	1.5
Slash pine	63.2	26.2	14.5	14.7	1.9	5.9	--	--	--
Shortleaf pine	178.4	37.8	48.3	40.4	26.5	15.8	6.6	3.0	--
Loblolly pine	5,777.9	697.0	994.8	1,094.1	1,053.2	718.6	538.0	638.0	44.2
Virginia pine	0.8	0.8	--	--	--	--	--	--	--
Pond pine	847.5	193.4	223.8	169.1	130.9	76.6	33.2	20.5	--
Spruce pine	12.2	1.9	5.2	--	3.9	--	1.2	--	--
Cypress	971.5	76.0	129.8	174.5	151.8	138.0	94.3	142.1	65.0
Other eastern softwoods	16.7	3.1	1.5	2.9	1.5	1.8	2.1	3.8	--
Total softwoods	9,191.6	1,387.6	1,795.6	1,803.0	1,543.0	1,024.1	698.5	829.1	110.7
Hardwood:									
Select white oaks[1]	235.4	--	36.2	52.9	35.8	36.2	21.2	38.2	14.9
Select red oaks[2]	151.7	--	17.7	25.6	21.7	20.3	14.7	47.1	4.6
Other white oaks	258.3	--	21.3	28.2	24.6	22.8	27.8	72.9	60.7
Other red oaks	1,456.4	--	201.5	186.3	200.9	182.4	163.6	389.2	132.5
Hickory	296.1	--	35.1	53.3	46.1	42.4	32.4	74.1	12.7
Hard maple	1.1	--	0.5	0.6	--	--	--	--	--
Soft maple	409.4	--	60.4	82.7	81.0	68.0	46.5	67.5	3.3
Beech	6.8	--	1.5	0.7	1.0	2.8	--	0.8	--
Sweetgum	1,593.1	--	267.8	344.8	282.9	238.3	172.8	229.9	56.6
Tupelo and blackgum	2,090.6	--	373.4	519.8	456.5	322.1	184.1	201.6	33.1
Ash	204.9	--	42.3	39.2	38.5	31.7	13.3	39.9	--
Cottonwood	67.3	--	12.0	18.8	12.5	7.7	2.1	9.2	5.0
Basswood	0.9	--	0.9	--	--	--	--	--	--
Yellow-poplar	278.6	--	45.7	43.8	69.3	52.7	28.1	35.3	3.7
Black walnut	--	--	--	--	--	--	--	--	--
Black cherry	0.4	--	0.4	--	--	--	--	--	--
Elm	143.1	--	18.9	23.2	20.8	20.8	12.6	36.3	10.5
Sycamore	42.7	--	4.7	1.1	7.6	5.5	7.0	16.8	--
Birch (except yellow)	31.8	--	6.7	9.0	6.7	3.7	4.5	1.2	--
Other eastern hardwoods	85.4	--	23.6	16.3	11.7	12.5	11.1	7.8	2.4
Total hardwoods	7,354.0	--	1,170.6	1,446.3	1,317.6	1,069.9	741.8	1,267.8	340.0
All species	16,545.6	1,387.6	2,966.2	3,249.3	2,860.6	2,094.0	1,440.3	2,096.9	450.7

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark, northern red, and Shumard oaks.

Table 17.--Net annual growth and removals of growing stock on commercial forest land, by species, 1967

Species	Net annual growth	Annual timber removals
	Million cubic feet	
Softwood:		
Yellow pines	162.6	108.2
Cypress	7.0	4.7
Other eastern softwoods	0.4	0.1
Total softwoods	170.0	113.0
Hardwood:		
Select white and red oaks	6.1	3.7
Other white and red oaks	30.2	12.0
Hickory	3.3	2.2
Hard maple	(1/)	--
Sweetgum	24.5	18.7
Ash, walnut, and black cherry	3.4	2.2
Yellow-poplar	6.1	3.1
Other hardwoods	31.0	26.4
Total hardwoods	104.6	68.3
All species	274.6	181.3

1/ Negligible.

Table 18.--Net annual growth and removals of sawtimber on commercial forest land, by species, 1967

Species	Net annual growth	Annual timber removals
	- - - - Million board feet - - - -	
Softwood:		
Yellow pines	603.9	401.0
Cypress	31.8	22.3
Other eastern softwoods	0.5	--
Total softwoods	636.2	423.3
Hardwood:		
Select white and red oaks	22.9	13.8
Other white and red oaks	76.5	32.6
Hickory	10.6	6.7
Hard maple	(1/)	--
Sweetgum	76.1	65.1
Ash, walnut, and black cherry	10.6	6.9
Yellow-poplar	26.1	11.4
Other hardwoods	95.5	93.7
Total hardwoods	318.3	230.2
All species	954.5	653.5

1/ Negligible.

Table 19.--Mortality of growing stock and sawtimber on commercial forest land, by species, 1967

Species	Growing stock	Sawtimber
	Million cubic feet	Million board feet
Softwood:		
Yellow pines	10.8	27.1
Cypress	0.4	1.0
Other eastern softwoods	0.1	0.4
Total softwoods	11.3	28.5
Hardwood:		
Select white and red oaks	1.0	3.4
Other white and red oaks	4.3	13.6
Hickory	0.3	1.4
Hard maple	--	--
Sweetgum	2.5	7.1
Ash, walnut, and black cherry	0.8	1.0
Yellow-poplar	0.3	0.4
Other hardwoods	6.1	14.3
Total hardwoods	15.3	41.2
All species	26.6	69.7

Table 20.--Volume of all live trees and growing stock on commercial forest land, by ownership class and species group, 1968

Ownership class	All live trees					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	406.3	225.5	30.9	105.1	44.8	365.9	221.6	29.3	83.2	31.8
Other public	204.0	136.6	3.5	29.9	34.0	180.9	134.7	2.8	22.5	20.9
Forest industry	1,600.5	577.6	101.3	603.1	318.5	1,361.8	559.3	96.9	462.2	243.4
Farmer	2,707.3	1,016.3	89.9	996.4	604.7	2,272.7	988.9	77.9	755.8	450.1
Miscellaneous private	1,398.6	445.5	62.8	547.3	343.0	1,159.9	434.8	53.9	418.1	253.1
All ownerships	6,316.7	2,401.5	288.4	2,281.8	1,345.0	5,341.2	2,339.3	260.8	1,741.8	999.3

Table 21.--Volume of sawtimber on commercial forest land, by ownership class and species group, 1968

Ownership class	Small sawtimber[1]					Large sawtimber[2]				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	579.1	409.4	38.8	112.7	18.2	676.8	455.5	65.9	93.3	62.1
Other public	338.6	297.6	7.3	19.6	14.1	236.5	159.9	2.1	33.9	40.6
Forest industry	1,947.0	1,139.9	152.3	477.4	177.4	2,124.4	652.2	213.2	756.7	502.3
Farmer	3,159.1	1,855.8	122.4	819.3	361.6	3,882.0	1,731.8	186.1	1,172.2	791.9
Miscellaneous private	1,579.3	895.7	67.0	421.3	195.3	2,022.8	605.6	133.1	791.1	493.0
All ownerships	7,603.1	4,598.4	387.8	1,850.3	766.6	8,942.5	3,605.0	600.4	2,847.2	1,889.9

1/ Volume of sawtimber trees less than 15.0 inches at d.b.h.
2/ Volume of sawtimber trees 15.0 inches and larger at d.b.h.

Table 22.--Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group, 1967

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	16.8	12.0	0.8	2.7	1.3	9.4	9.3	--	0.1	--
Other public	11.7	9.3	0.3	1.0	1.1	2.6	2.0	--	0.1	0.5
Forest industry	71.1	43.2	2.6	15.4	9.9	57.3	33.9	3.0	14.7	5.7
Farmer	118.2	66.8	2.1	28.0	21.3	76.6	42.9	1.2	22.1	10.4
Miscellaneous private	56.8	31.3	1.6	13.5	10.4	35.4	20.1	0.6	10.0	4.7
All ownerships	274.6	162.6	7.4	60.6	44.0	181.3	108.2	4.8	47.0	21.3

Table 23.--Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group, 1967

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	65.4	50.4	3.4	7.7	3.9	34.2	33.7	--	0.5	--
Other public	41.0	34.6	0.5	3.3	2.6	8.4	6.7	--	--	1.7
Forest industry	249.7	159.2	11.4	49.5	29.6	210.5	126.0	14.7	51.6	18.2
Farmer	399.9	243.2	9.8	91.2	55.7	276.9	168.8	5.3	76.0	26.8
Miscellaneous private	198.5	116.5	7.2	43.0	31.8	123.5	65.8	2.3	38.2	17.2
All ownerships	954.5	603.9	32.3	194.7	123.6	653.5	401.0	22.3	166.3	63.9

Table 24.--Average net volume per acre of sawtimber, growing stock, and other live timber[1/] on commercial forest land, by ownership class, major forest type, and species group, 1968

Forest type, species group, and class of material	Ownership class											
	All ownerships		National Forest		Other public		Forest industry		Farmer		Misc. private	
	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet
Pine types:												
Growing stock:												
Softwood	3,041	900.1	5,246	1,382.5	2,665	813.0	2,405	793.4	3,411	969.7	2,682	799.8
Hardwood	174	85.7	335	140.9	103	51.4	133	67.3	214	104.8	138	72.7
Total	3,215	985.8	5,581	1,523.4	2,768	864.4	2,538	860.7	3,625	1,074.5	2,820	872.5
Other timber:												
Softwood	--	25.3	--	26.8	--	12.2	--	26.7	--	27.5	--	24.2
Hardwood	--	40.8	--	56.9	--	31.1	--	34.0	--	45.1	--	41.2
Total	--	66.1	--	83.7	--	43.3	--	60.7	--	72.6	--	65.4
Oak-pine type:												
Growing stock:												
Softwood	2,010	542.5	5,009	1,174.5	1,611	377.1	2,211	622.0	1,954	524.0	1,537	439.3
Hardwood	810	344.1	1,922	797.8	376	108.2	944	403.7	718	313.9	800	328.2
Total	2,820	886.6	6,931	1,972.3	1,987	485.3	3,155	1,025.7	2,672	837.9	2,337	767.5
Other timber:												
Softwood	--	14.5	--	22.8	--	--	--	21.7	--	14.4	--	9.6
Hardwood	--	120.2	--	288.7	--	28.9	--	107.1	--	124.3	--	111.1
Total	--	134.7	--	311.5	--	28.9	--	128.8	--	138.7	--	120.7
Upland hardwood types:												
Growing stock:												
Softwood	569	149.0	336	98.8	305	96.8	603	153.3	575	151.8	588	151.0
Hardwood	1,923	737.7	5,223	1,863.4	584	222.9	2,503	886.7	1,739	702.4	2,024	744.1
Total	2,492	886.7	5,559	1,962.2	889	319.7	3,106	1,040.0	2,314	854.2	2,612	895.1
Other timber:												
Softwood	--	4.9	--	31.0	--	1.9	--	3.0	--	5.8	--	2.9
Hardwood	--	216.8	--	511.6	--	172.1	--	233.3	--	207.3	--	220.5
Total	--	221.7	--	542.6	--	174.0	--	236.3	--	213.1	--	223.4
Bottomland hardwood types:												
Growing stock:												
Softwood	1,183	294.8	3,316	868.4	730	166.3	1,405	359.0	1,067	254.5	894	228.0
Hardwood	4,331	1,527.8	3,402	1,400.9	2,648	1,074.6	4,401	1,576.9	3,994	1,420.8	5,093	1,711.2
Total	5,514	1,822.6	6,718	2,269.3	3,378	1,240.9	5,806	1,935.9	5,061	1,675.3	5,987	1,939.2
Other timber:												
Softwood	--	23.8	--	25.1	--	34.3	--	14.9	--	26.0	--	29.0
Hardwood	--	479.4	--	349.5	--	394.1	--	485.9	--	453.8	--	539.8
Total	--	503.2	--	374.6	--	428.4	--	500.8	--	479.8	--	568.8
All types:												
Growing stock:												
Softwood	1,961	554.6	4,610	1,193.3	1,990	586.6	1,880	571.5	1,888	516.7	1,657	476.5
Hardwood	1,576	587.2	1,358	546.0	457	183.5	1,678	618.3	1,527	585.6	1,865	658.6
Total	3,537	1,141.8	5,968	1,739.3	2,447	770.1	3,558	1,189.8	3,415	1,102.3	3,522	1,135.1
Other timber:												
Softwood	--	19.2	--	26.2	--	11.2	--	19.8	--	19.1	--	19.2
Hardwood	--	189.3	--	165.6	--	86.6	--	189.0	--	191.5	--	213.8
Total	--	208.5	--	191.8	--	97.8	--	208.8	--	210.6	--	233.0
All timber	3,537	1,350.3	5,968	1,931.1	2,447	867.9	3,558	1,398.6	3,415	1,312.9	3,522	1,368.1

1/ Rough and rotten trees.

Table 25.--Land area, by class, major forest type, and survey completion date, 1947, 1958, and 1968

Land use class	Survey completion date			Change 1958-1968
	1947	1958	1968	
	- - - - - - Thousand acres - - - - - -			
Forest land:				
Commercial forest land:				
Pine and oak-pine types	2,705.0	2,494.4	2,673.8	+179.4
Hardwood types	2,149.5	2,181.8	2,013.6	-168.2
Total	4,854.5	4,676.2	4,687.4	+ 11.2
Noncommercial forest land:				
Productive-reserved	18.6	14.4	19.0	+ 4.6
Unproductive	1.7	2.7	10.4	+ 7.7
Total	20.3	17.1	29.4	+ 12.3
Nonforest land:				
Cropland	1,966.2	2,062.4	1,886.7	-175.7
Pasture and range	120.0	171.8	177.1	+ 5.3
Other	463.7	480.9	625.2	+144.3
Total	2,549.9	2,715.1	2,689.0	- 26.1
All land[1/]	7,424.7	7,408.4	7,405.8	- 2.6

1/ Excludes all water areas.

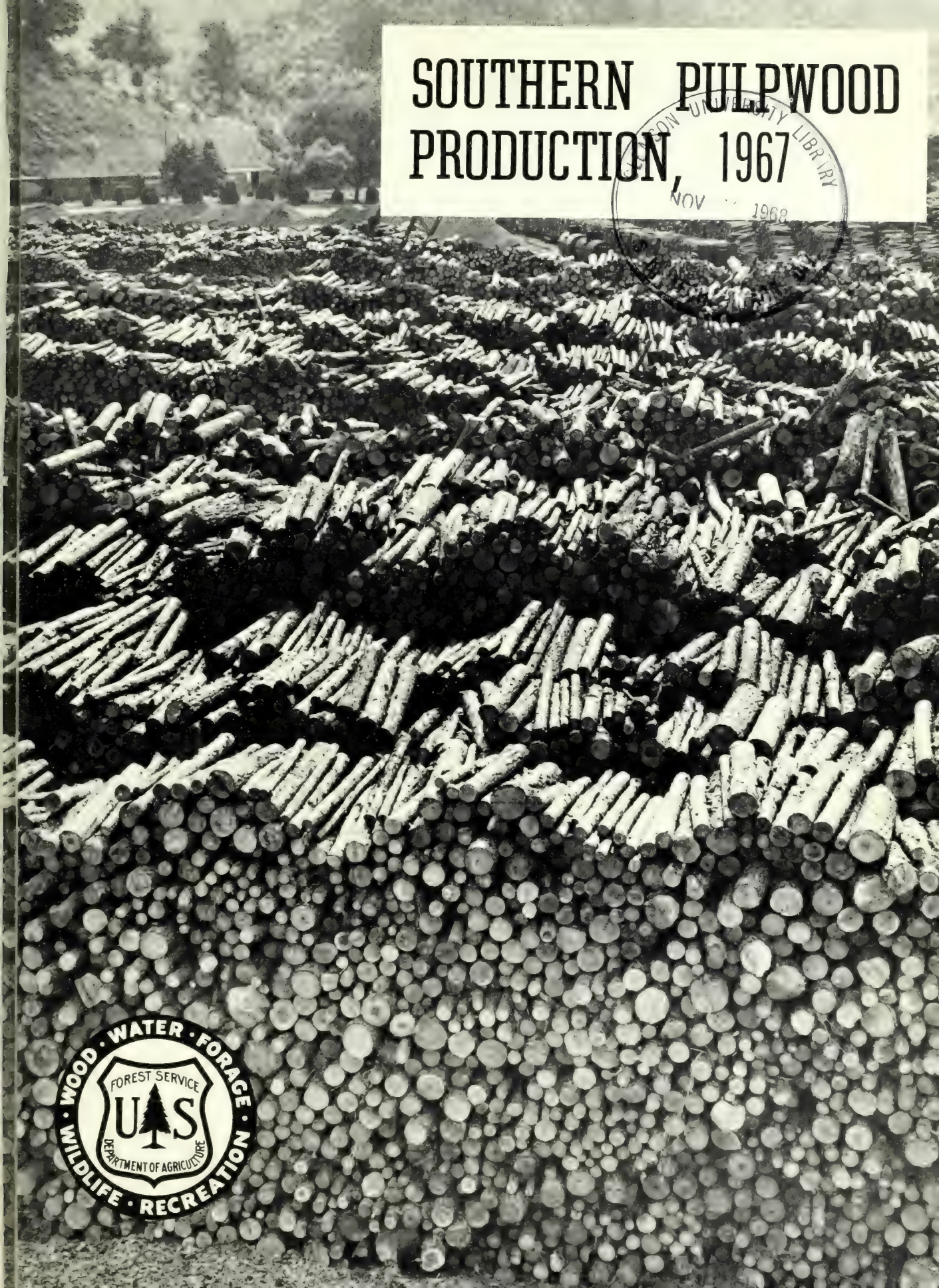
Table 26.--Volume[1/] of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date

Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
SAWTIMBER (in million board feet)											
Softwood	1947	8,575.4	--	--	1,121.6	1,551.3	1,913.7	1,546.7	939.7	539.5	962.9
	1958	7,353.6	--	--	1,209.9	1,532.6	1,374.3	1,209.0	855.4	478.9	693.5
	1968	9,191.6	--	--	1,387.6	1,795.6	1,803.0	1,543.0	1,024.1	698.5	939.8
Hardwood	1947	8,478.3	--	--	--	1,201.2	1,515.8	1,449.1	1,330.0	832.0	2,150.2
	1958	6,600.0	--	--	--	1,031.9	1,352.5	1,130.4	963.4	669.8	1,452.0
	1968	7,354.0	--	--	--	1,170.6	1,446.3	1,317.6	1,069.9	741.8	1,607.8
GROWING STOCK (in million cubic feet)											
Softwood	1947	2,264.0	91.5	199.2	300.8	369.6	432.0	340.4	204.6	117.7	208.2
	1958	2,093.7	146.0	241.0	324.5	365.2	310.2	266.1	186.2	104.5	150.0
	1968	2,600.1	193.4	281.7	372.1	427.8	407.0	339.6	222.9	152.4	203.2
Hardwood	1947	2,928.7	132.5	203.8	310.2	398.7	423.2	373.2	335.7	209.4	542.0
	1958	2,433.6	141.2	205.1	298.4	342.5	377.6	291.1	243.2	168.5	366.0
	1968	2,741.1	167.6	254.0	325.9	388.5	403.8	339.3	270.0	186.7	405.3
ALL LIVE TIMBER (in million cubic feet)											
Softwood	1947	2,333.5	101.3	214.5	314.2	376.1	435.6	341.7	206.6	118.6	224.9
	1958	2,166.7	161.7	259.4	338.9	371.6	312.8	267.1	188.1	105.2	161.9
	1968	2,689.9	213.3	303.5	388.5	435.3	410.4	340.9	225.1	153.5	219.4
Hardwood	1947	3,833.1	225.3	311.2	432.7	524.9	517.6	450.0	401.4	255.2	714.8
	1958	3,212.1	240.1	313.1	416.2	450.9	461.8	351.0	290.8	205.5	482.7
	1968	3,626.8	285.1	387.4	454.8	511.5	494.0	409.1	322.9	227.6	534.4

1/ To provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in previous surveys.

SOUTHERN PULPWOOD PRODUCTION, 1967

LIBRARY
NOV 1968



In this report:

	Page
SOUTHERN PULPWOOD PRODUCTION BY—	
—state	1
—species group	1,8
—county	4,5,9-19
—roundwood and residues	8
—territory	9
MAP OF SOUTHERN COUNTIES	3
NUMBER OF MILLS PROCURING ROUNDWOOD, BY COUNTY	6,7
PULPMILLS USING SOUTHERN WOOD BY—	
—capacity and location	2,20-23
—process and location	20,21

SOUTHERN PULPWOOD PRODUCTION, 1967

Noel D. Cost

SOUTHEASTERN FOREST EXPERIMENT STATION
Asheville, North Carolina

and

SOUTHERN FOREST EXPERIMENT STATION
New Orleans, Louisiana

of the

Forest Service, U. S. Department of Agriculture

in cooperation with

SOUTHERN PULPWOOD CONSERVATION ASSOCIATION
Atlanta, Georgia

1968

PULPWOOD PRODUCTION IN THE SOUTH leveled off slightly in 1967 but still established another record high of 33,651,100 cords—63 percent of the Nation's total. Significant gains were noted in the use of residues, whereas roundwood production showed a slight decrease for the first time in 10 years. At the year's end, there were 92 mills in operation in the South with a total daily pulping capacity exceeding 70,000 tons, and eight new mills now under construction will boost the total daily capacity by 5,300 tons. Eight mills outside the region also used wood harvested in the South in 1967.

In 1967, pulpwood produced in the South exceeded the previous record production in 1966 by 2 percent—an increase that is substantially below the average annual increase of 6 percent which had prevailed over the 1962-66 period. The slowdown was apparently a response to the general adjustments and slackening in economic activity in the early months of 1967, but pulpwood production will probably resume the faster upward trend of recent years.

Nevertheless, when both roundwood and residues are included, gains in pulpwood production were reported in 7 of the 12 southern states (table 1). Alabama had the largest increase, 342,000 cords, followed by North Carolina with an increase of 104,300 cords. The largest decline was in Florida, where production was down 64,300 cords, or 2 percent. Production was also off slightly in Louisiana and Mississippi, but remained about the same in Georgia and Virginia. Georgia continued to lead the region in total production with over 6.3 million cords.

Table 1. *Pulpwood production in the South during 1967 and change since 1966*

State	Round pulpwood and residues	Change
	Thousand cords	*Percent*
Alabama	5,633.9	+ 6
Arkansas	2,208.4	+ 1
Florida	2,925.6	− 2
Georgia	6,326.4	(1)
Louisiana	2,661.9	− 1
Mississippi	2,924.6	− 1
North Carolina	3,156.8	+ 3
Oklahoma	118.8	+ 2
South Carolina	2,947.5	+ 3
Tennessee	395.2	+ 7
Texas	1,993.1	+ 5
Virginia	2,358.9	(1)
All States	33,651.1	+ 2

[1] Less than 0.5 percent.

At the county level, three counties in Alabama had the highest pulpwood production: Baldwin County was the leader with 221,182 cords, Washington County second with 203,165 cords, and Choctaw County third with a total output of 192,430 cords. Across the South, over 100,000 cords each were produced in 41 counties, as compared to 43 counties in 1966.

Pulpwood from residues of other primary wood-using plants accounted for all of the increase and comprised over 19 percent of total production in 1967. There was a small decrease in roundwood production for the first time in 10 years. Of the 27.2 million cords of roundwood harvested in 1967, 76 percent was pine and 24 percent hardwood.

The growth of the southern pulpwood industry over the past 10 years has been remarkable. From 1957 to 1967, annual pulpwood production in the South rose from 19.8 million cords to 33.7 million cords—an increase of 70 percent (fig. 1). Over the same period, hardwood roundwood production has climbed from 2.9 million cords to 6.4 million cords. One of

Table 2. *Round pulpwood production in the South, by State and species group, 1967*

State	All species	Pine	Hardwood			
			Total	Gums	Oaks	Other hardwoods
	Thousand cords					
Alabama	4,781.3	3,626.0	1,155.3	446.9	401.1	307.3
Arkansas	1,458.9	1,021.6	437.3	72.2	299.7	65.4
Florida	2,588.7	2,352.3	236.4	103.5	75.0	57.9
Georgia	5,425.8	4,840.4	585.4	263.2	226.3	95.9
Louisiana	2,049.6	1,473.0	576.6	242.5	183.4	150.7
Mississippi	2,346.0	1,460.4	885.6	404.5	165.4	315.7
North Carolina	2,446.0	1,719.6	726.4	215.8	262.0	248.6
Oklahoma	59.2	19.5	39.7	0.8	2.7	36.2
South Carolina	2,371.3	1,776.0	595.3	245.0	206.5	143.8
Tennessee	336.5	157.6	178.9	10.8	122.9	45.2
Texas	1,409.9	1,087.3	322.6	106.7	166.9	49.0
Virginia	1,898.9	1,230.9	668.0	103.3	331.4	233.3
All States	27,172.1	20,764.6	6,407.5	2,215.2	2,443.3	1,749.0

the most significant aspects of the increase in hardwood production is the industry's use of a greater proportion of oaks and other hard-

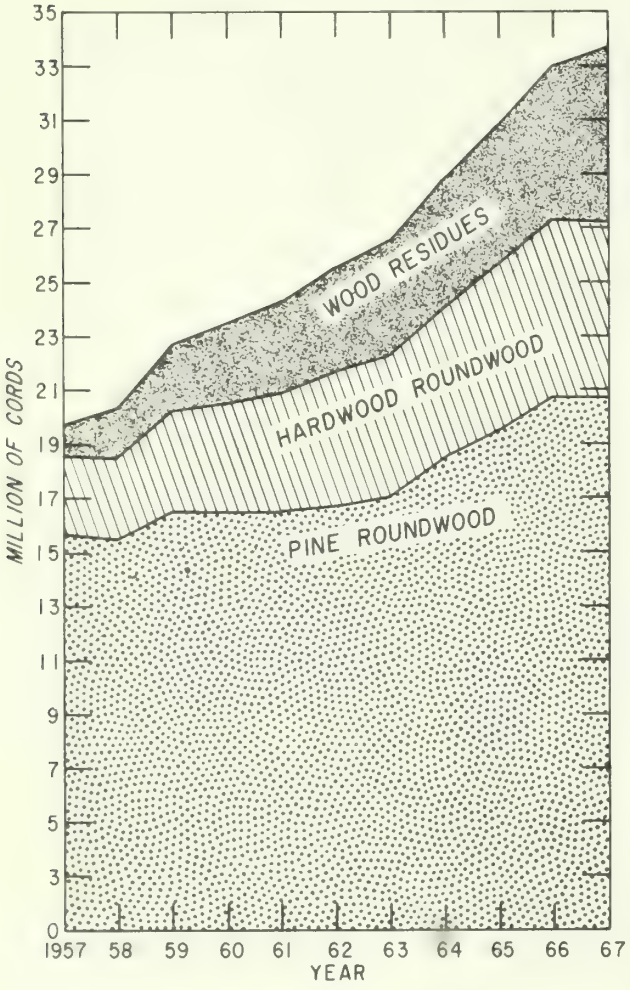


Figure 1. *Pulpwood production in the South by pine and hardwood roundwood and residues.*

textured species. Oaks accounted for 38 percent of the total roundwood production of hardwood in 1967, and exceeded the output of gums for the second consecutive year (table 2). Use of residues for pulpwood in the South during the past decade has increased steadily, resulting in a fivefold increase over this relatively short span of time. Although it is becoming increasingly more difficult to separate the use of residues from roundwood, the fact remains that better utilization has played and will continue to play an important role in the region's ability to produce a greater share of the Nation's total pulpwood production. The industry has done very well in adapting its wood requirements to the available sources of wood in a region which produced 63 percent of the Nation's domestic pulpwood in 1967.

During the last 10 years, pulpmills have increased in size and number. The combined daily pulping capacity of the southern pulpmills, for example, increased from 40,997 tons in 1957 to 70,527 tons in 1967 (fig. 2). With

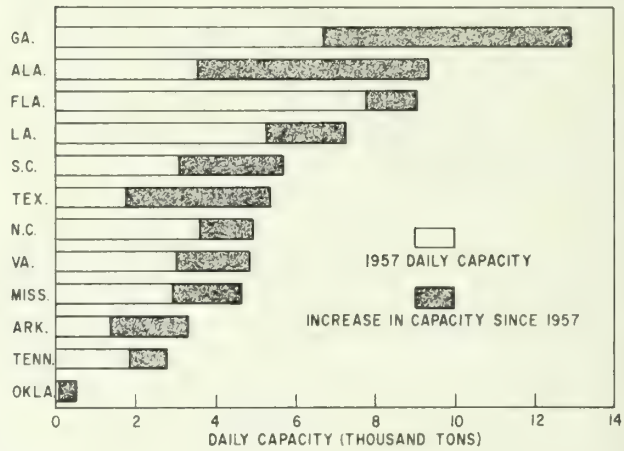


Figure 2. *Daily pulping capacity in the South by State, 1957-1967.*

the continued growth in capacity, there has been a trend toward larger mills during the past decade. The average daily pulping capacity is now 767 tons, as compared to 569 tons in 1957. Of the 92 pulpmills in the South today, 23 have daily pulping capacities exceeding 1,000 tons, compared to 10 out of 72 mills in 1957. Over the entire 10-year period, more than one-half of the total expansion has taken place in Georgia, Alabama, and Texas.

During 1967, establishment of six new mills, together with expansion of existing facilities, boosted the South's pulping capacity by more than 5 percent. At the end of the year, eight new mills were under construction in the South. Two mills are being erected in Louisiana; and Alabama, Arkansas, Georgia, Mississippi, North Carolina, and South Carolina each has one under construction. When these mills begin operating, their combined pulping capacity is expected to total over 5,300 tons per day. With the addition of more mills and enlargement of existing facilities each year, the demand for southern pulpwood is likely to continue its rapid rate of increase.

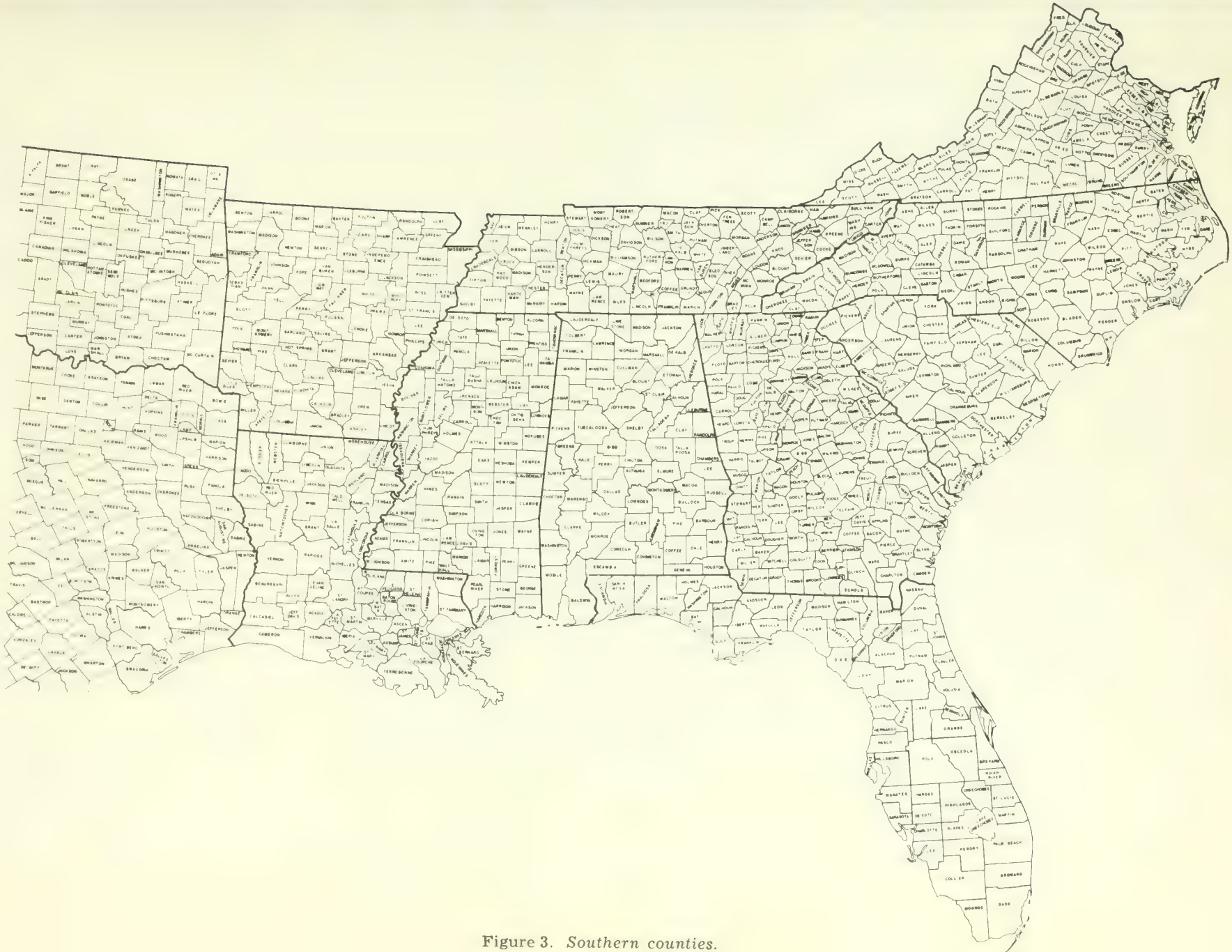


Figure 3. *Southern counties.*

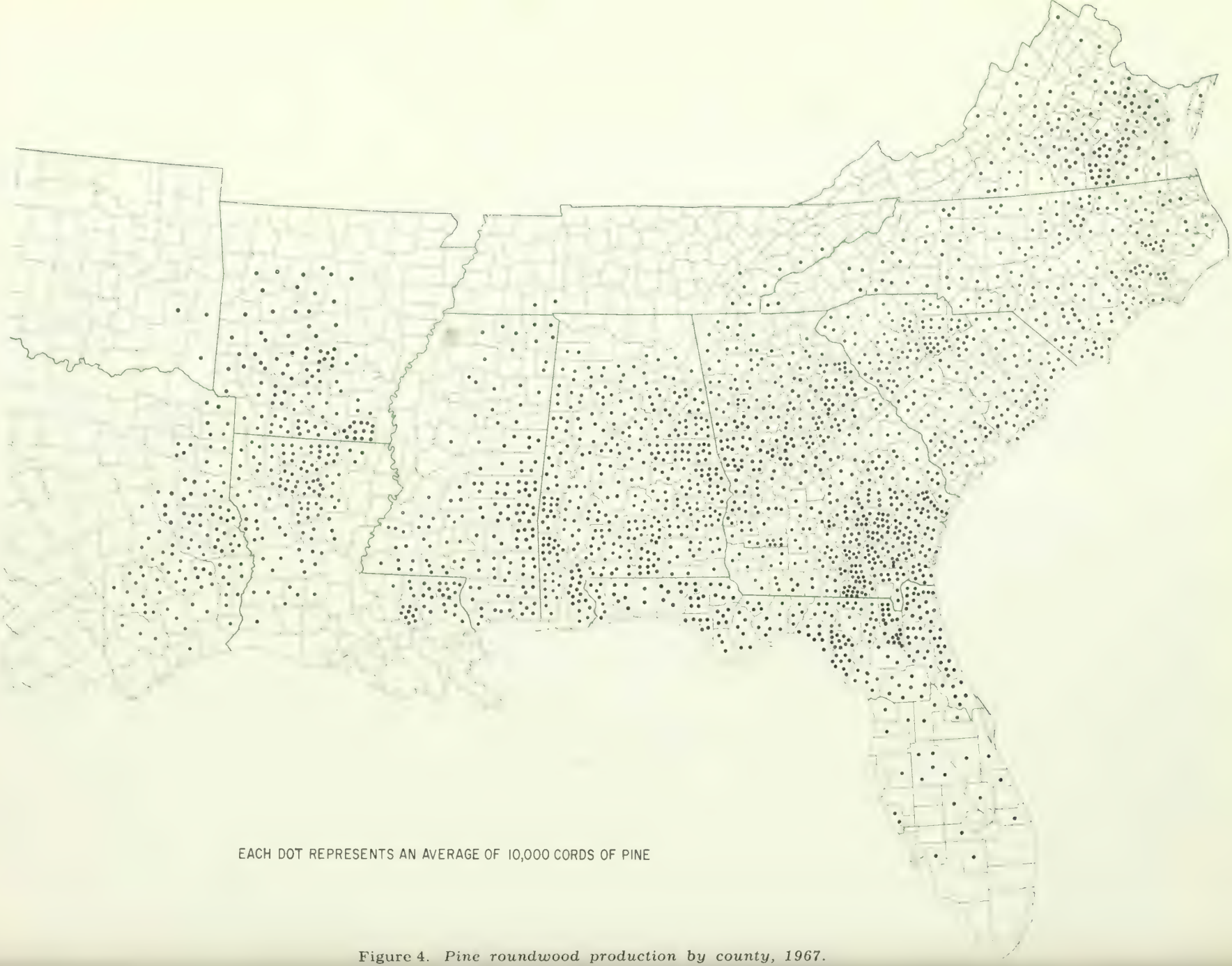


Figure 4. *Pine roundwood production by county, 1967.*

Figure 5.—*Hardwood roundwood production by county, 1967.*

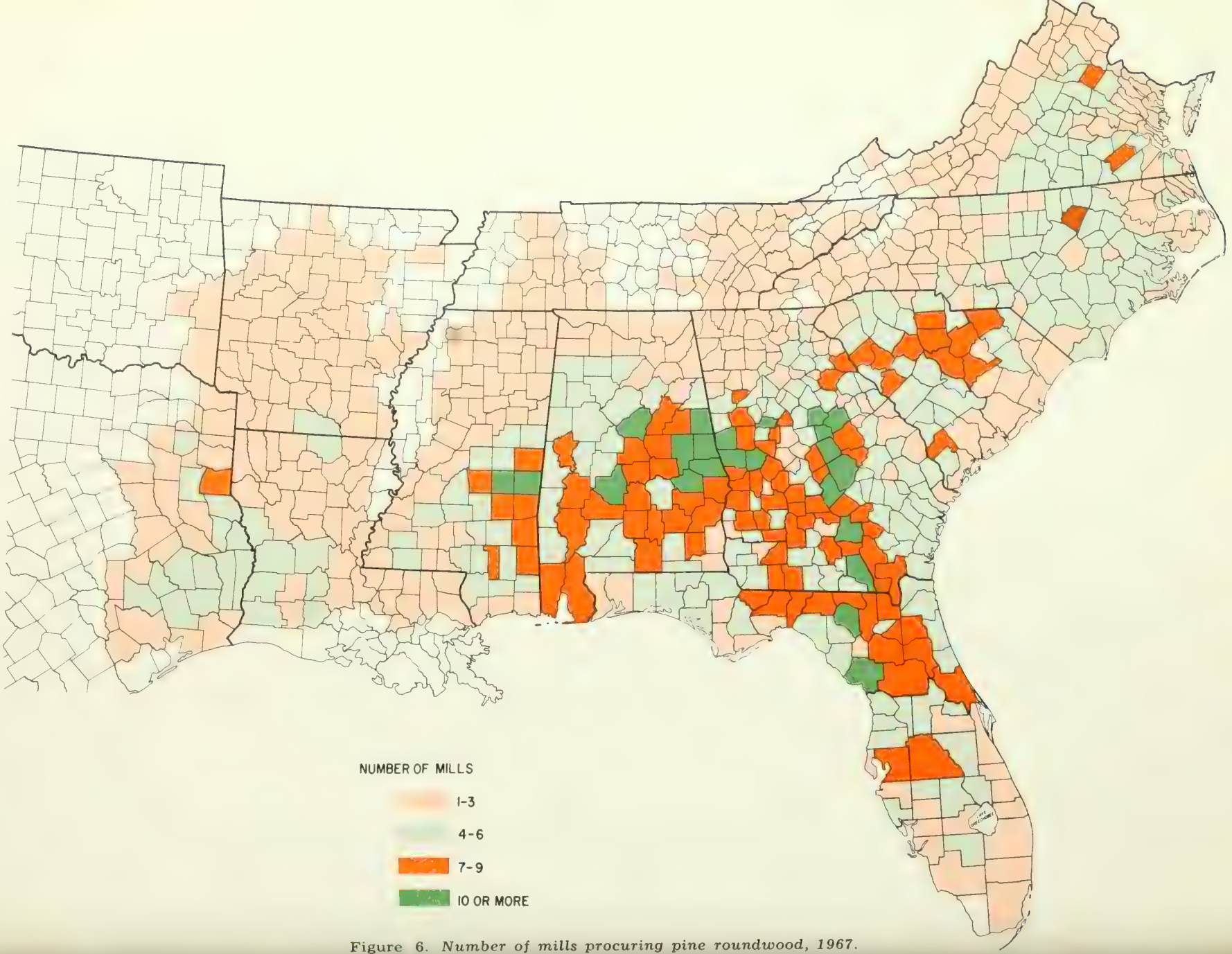


Figure 6. *Number of mills procuring pine roundwood, 1967.*

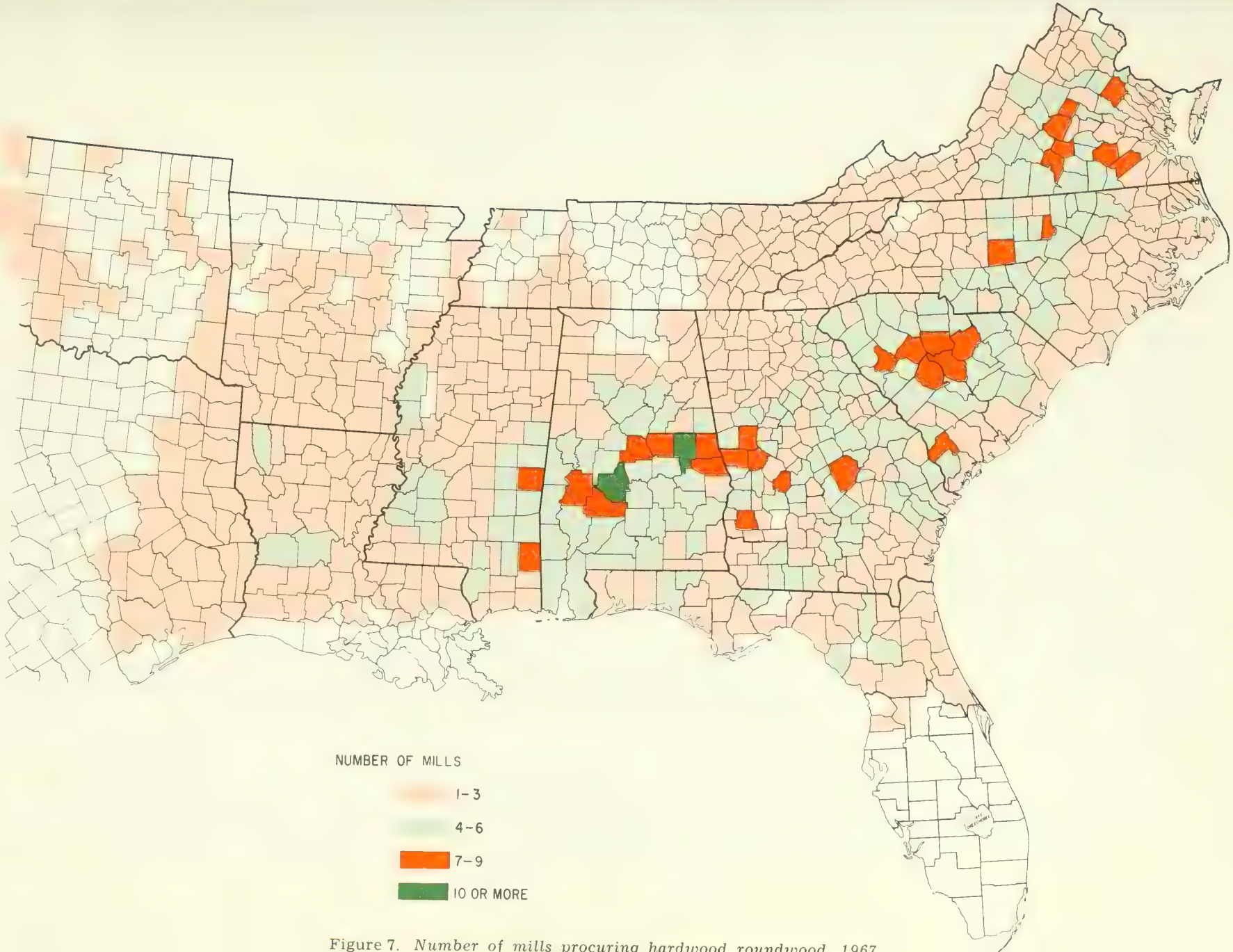


Figure 7. *Number of mills procuring hardwood roundwood, 1967.*

Table 3. *Round pulpwood production in the South, by State and species group, 1967 and 1966*

State	Change from 1966	1967			1966		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Percent	*Thousand cords*					
Alabama	+ 7	4,781.3	3,626.0	1,155.3	4,464.3	3,269.4	1,194.9
Arkansas	— 6	1,458.9	1,021.6	437.3	1,544.8	989.9	554.9
Florida	— 3	2,588.7	2,352.3	236.4	2,676.1	2,424.1	252.0
Georgia	(1)	5,425.8	4,840.4	585.4	5,426.5	4,866.0	560.5
Louisiana	— 7	2,049.6	1,473.0	576.6	2,200.5	1,653.8	546.7
Mississippi	— 5	2,346.0	1,460.4	885.6	2,475.3	1,560.3	915.0
North Carolina	+ 2	2,446.0	1,719.6	726.4	2,396.8	1,733.5	663.3
Oklahoma	— 5	59.2	19.5	39.7	62.2	15.9	46.3
South Carolina	+ 1	2,371.3	1,776.0	595.3	2,343.5	1,803.4	540.1
Tennessee	+ 3	336.5	157.6	178.9	327.4	152.1	175.3
Texas	+ 3	1,409.9	1,087.3	322.6	1,374.7	975.1	399.6
Virginia	— 5	1,898.9	1,230.9	668.0	2,007.6	1,334.3	673.3
All States	(1)	27,172.1	20,764.6	6,407.5	27,299.7	20,777.8	6,521.9

[1] Less than 0.5 percent.

Table 4. *Southern output of wood residues chipped for pulp manufacture, by State and species group, 1967 and 1966*

State	Change from 1966	1967			1966		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Percent	*Thousand cords*					
Alabama	+ 3	852.6	654.6	198.0	827.6	605.5	222.1
Arkansas	+16	749.5	679.6	69.9	648.4	614.7	33.7
Florida	+ 7	336.9	252.9	84.0	313.8	254.8	59.0
Georgia	+ 3	900.6	736.6	164.0	871.6	726.5	145.1
Louisiana	+29	612.3	545.2	67.1	474.7	432.8	41.9
Mississippi	+22	578.6	449.7	128.9	474.2	353.3	120.9
North Carolina	+ 8	710.8	527.9	182.9	655.7	500.8	154.9
Oklahoma	+ 9	59.6	59.1	0.5	54.8	54.8	.
South Carolina	+13	576.2	428.8	147.4	510.8	366.3	144.5
Tennessee	+38	58.7	8.7	50.0	42.6	10.0	32.6
Texas	+10	583.2	538.1	45.1	529.4	491.6	37.8
Virginia	+29	460.0	264.5	195.5	357.9	217.7	140.2
All States	+12	6,479.0	5,145.7	1,333.3	5,761.5	4,628.8	1,132.7

Table 5. *Southern output of wood residues chipped for pulp manufacture, by State and type of residue, 1967*

State	All types	Chips			Other residues [1]		
		All species	Pine	Hardwood	All species	Pine	Hardwood
	Thousand cords						
Alabama	852.6	785.7	592.4	193.3	66.9	62.2	4.7
Arkansas	749.5	696.3	626.4	69.9	53.2	53.2	.
Florida	336.9	335.8	252.9	82.9	1.1	.	1.1
Georgia	900.6	898.0	736.5	161.5	2.6	0.1	2.5
Louisiana	612.3	585.7	518.6	67.1	26.6	26.6	(2)
Mississippi	578.6	540.7	412.2	128.5	37.9	37.5	0.4
North Carolina	710.8	671.2	501.0	170.2	39.6	26.9	12.7
Oklahoma	59.6	59.1	59.1	.	0.5	.	0.5
South Carolina	576.2	529.9	385.3	144.6	46.3	43.5	2.8
Tennessee	58.7	58.7	8.7	50.0	.	.	.
Texas	583.2	557.1	518.2	38.9	26.1	19.9	6.2
Virginia	460.0	428.4	235.6	192.8	31.6	28.9	2.7
All States	6,479.0	6,146.6	4,846.9	1,299.7	332.4	298.8	33.6

[1] Veneer cores, pole and piling trim, cull crossties, sawdust, secondary residues.
[2] Negligible.

Table 6. *Southern pulpwood production by Experiment Station territory, 1967*

Station and source of wood	All species	Pine	Hardwood
	Standard cords		
Southeastern			
Roundwood	14,730,738	11,919,223	2,811,515
Residues	2,984,491	2,210,695	773,796
Total	17,715,229	14,129,918	3,585,311
Southern			
Roundwood	12,441,435	8,845,460	3,595,975
Residues	3,494,454	2,934,909	559,545
Total	15,935,889	11,780,369	4,155,520
All States			
Roundwood	27,172,173	20,764,683	6,407,490
Residues	6,478,945	5,145,604	1,333,341
Total	33,651,118	25,910,287	7,740,831

Table 7. *Round pulpwood production in Alabama, 1967.*

County	All species	Pine	Hardwood
	Standard cords		
Autauga	28,638	24,729	3,909
Baldwin	221,182	178,960	42,222
Barbour	108,320	95,501	12,819
Bibb	71,067	59,162	11,905
Blount	31,503	31,492	11
Bullock	80,421	75,215	5,206
Butler	148,278	85,435	62,843
Calhoun	56,992	51,576	5,416
Chambers	92,842	82,794	10,048
Cherokee	18,147	14,377	3,770
Chilton	55,561	45,873	9,688
Choctaw	192,430	115,569	76,861
Clarke	158,931	69,676	89,255
Clay	80,406	71,698	8,708
Cleburne	51,910	46,962	4,948
Coffee	41,465	29,660	11,805
Colbert	3,247	3,172	75
Conecuh	110,576	76,983	33,593
Coosa	94,231	78,227	16,004
Covington	148,747	115,947	32,800
Crenshaw	103,040	76,544	26,496
Cullman	44,671	42,207	2,464
Dale	69,575	47,983	21,592
Dallas	78,967	43,566	35,401
De Kalb	15,231	13,608	1,623
Elmore	45,771	42,430	3,341
Escambia	102,137	78,919	23,218
Etowah	23,676	21,577	2,099
Fayette	46,762	44,353	2,409
Franklin	19,892	19,126	766
Geneva	25,701	19,154	6,547
Greene	54,483	34,042	20,441
Hale	41,839	27,592	14,247
Henry	54,942	44,257	10,685
Houston	17,911	13,345	4,566
Jackson	6,628	4,769	1,859
Jefferson	58,601	56,588	2,013
Lamar	25,224	25,211	13
Lauderdale	3,974	3,322	652
Lawrence	3,584	3,584	
Lee	93,558	89,741	3,817
Limestone	2,818	2,818	
Lowndes	70,644	43,710	26,934
Macon	62,934	57,486	5,448
Madison	1,114	1,114	
Marengo	152,851	74,307	78,544
Marion	28,578	28,427	151
Marshall	15,059	15,059	
Mobile	164,284	120,791	43,493
Monroe	149,252	99,610	49,642
Montgomery	76,243	51,405	24,838
Morgan	1,900	1,900	
Perry	49,880	26,783	23,097
Pickens	89,955	62,663	27,292
Pike	85,309	65,758	19,551
Randolph	83,410	78,629	4,781
Russell	75,538	74,025	1,513
St. Clair	58,457	54,946	3,511
Shelby	76,856	66,873	9,983
Sumter	111,547	59,125	52,422
Talladega	54,124	49,946	4,178
Tallapoosa	123,525	100,633	22,892
Tuscaloosa	75,128	65,859	9,269
Walker	66,632	63,680	2,952
Washington	203,165	141,344	61,821
Wilcox	133,080	76,158	56,922
Winston	38,002	37,999	3
All counties	4,781,346	3,625,974	1,155,372

Table 8. *Round pulpwood production in Arkansas, 1967*

County	All species	Pine	Hardwood
	Standard cords		
Arkansas	3	3	
Ashley	180,280	128,697	51,583
Baxter			
Benton			
Boone			
Bradley	22,849	14,431	8,418
Calhoun	47,517	38,489	9,028
Carroll			
Chicot	7,864	9	7,855
Clark	49,225	42,493	6,732
Clay			
Cleburne	7,428	6,926	502
Cleveland	28,388	17,704	10,684
Columbia	88,978	60,435	28,543
Conway	8,314	7,803	511
Craighead	11	11	
Crawford	1,358		1,358
Crittenden	6,935		6,935
Cross			
Dallas	69,775	51,536	18,239
Desha	12,945		12,945
Drew	71,948	26,396	45,552
Faulkner	5,488	5,488	
Franklin	5,733	5,733	
Fulton			
Garland	17,013	11,174	5,839
Grant	117,657	71,377	46,280
Greene			
Hempstead	33,687	23,876	9,811
Hot Spring	31,337	25,423	5,914
Howard	22,114	19,469	2,645
Independence	3,162	1,900	1,262
Izard			
Jackson			
Jefferson	39,200	24,093	15,107
Johnson	11,533	7,915	3,618
Lafayette	39,287	23,386	15,901
Lawrence			
Lee	1,403		1,403
Lincoln	18,622	3,388	15,234
Little River	6,418	5,332	1,086
Logan	15,644	14,843	801
Lonoke	1,061	96	965
Madison			
Marion	99	99	
Miller	16,426	12,263	4,163
Mississippi	352		352
Monroe	24	24	
Montgomery	30,602	22,809	7,793
Nevada	54,090	45,298	8,792
Newton	2,429	2,429	
Ouachita	46,673	36,093	10,580
Perry	17,186	16,666	520
Phillips	12,323	900	11,423
Pike	33,529	29,334	4,195
Poinsett			
Polk	9,660	7,853	1,807
Pope	23,968	21,843	2,125
Prairie	49		49
Pulaski	8,660	8,192	468
Randolph	2		2
St. Francis			
Saline	32,199	21,943	10,256
Scott	9,053	9,053	
Searcy	2,124	2,124	
Sebastian	2,122	2,122	
Sevier	11,085	8,052	3,033
Sharp			
Stone	4,692	4,692	
Union	124,803	97,585	27,218
Van Buren	15,397	15,394	3
Washington			
White	13,058	3,831	9,227
Woodruff			
Yell	15,095	14,586	509
All counties	1,458,877	1,021,611	437,266

Table 9. *Round pulpwood production in Florida, 1967*

County	All species	Pine	Hardwood
	Standard cords		
Alachua	45,771	32,493	13,278
Baker	99,480	99,453	27
Bay	64,084	63,430	654
Bradford	91,254	85,544	5,710
Brevard	5,961	5,961	
Broward	23	23	
Calhoun	61,225	53,537	7,688
Charlotte	1,029	1,029	
Citrus	5,540	5,540	
Clay	75,212	72,383	2,829
Collier	4,508	4,508	
Columbia	97,561	87,256	10,305
Dade	4,014	4,014	
De Soto	3,233	3,233	
Dixie	99,782	76,971	22,811
Duval	76,819	74,797	2,022
Escambia	81,534	74,955	6,579
Flagler	55,220	53,000	2,220
Franklin	19,272	19,272	
Gadsden	45,749	41,395	4,354
Gilchrist	7,586	7,586	
Glades	5,262	5,262	
Gulf	34,586	32,544	2,042
Hamilton	67,965	63,561	4,404
Hardee	3,356	3,356	
Hendry	12,679	12,679	
Hernando	13,927	10,178	3,749
Highlands	12,977	12,977	
Hillsborough	9,382	9,382	
Holmes	63,173	54,544	8,629
Indian River	6,005	6,005	
Jackson	81,271	61,920	19,351
Jefferson	46,199	44,817	1,382
Lafayette	124,709	117,752	6,957
Lake	17,861	17,861	
Lee	9,080	9,080	
Leon	31,228	31,228	
Levy	70,393	58,519	11,874
Liberty	48,041	36,759	11,282
Madison	56,427	52,966	3,461
Manatee	3,271	3,271	
Marion	80,759	75,889	4,870
Martin	7,231	7,231	
Monroe			
Nassau	141,875	114,787	27,088
Okaloosa	27,084	23,553	3,531
Okeechobee	5,420	5,420	
Orange	1,167	1,167	
Osceola	11,994	11,994	
Palm Beach	3,349	3,349	
Pasco	4,997	4,997	
Pinellas	1,701	1,701	
Polk	46,991	46,991	
Putnam	76,212	61,301	14,911
St. Johns	80,214	74,919	5,295
St. Lucie	3,380	3,380	
Santa Rosa	64,236	60,447	3,789
Sarasota	15,137	15,137	
Seminole	9,278	9,278	
Sumter	8,222	8,203	19
Suwannee	30,050	26,345	3,705
Taylor	89,028	84,338	4,690
Union	15,448	14,691	757
Volusia	63,421	63,107	314
Wakulla	37,961	37,947	14
Walton	45,386	38,021	7,365
Washington	55,532	47,039	8,493
All counties	2,588,722	2,352,273	236,449

Table 10. *Round pulpwood production in Georgia, 1967*

County	All species	Pine	Hardwood
	Standard cords		
Appling	113,227	108,105	5,122
Atkinson	74,673	73,797	876
Bacon	69,331	68,838	493
Baker	16,413	13,075	3,338
Baldwin	35,519	30,731	4,788
Banks	20,468	18,534	1,934
Barrow	21,570	21,256	314
Bartow	8,950	7,789	1,161
Ben Hill	44,684	42,777	1,907
Berrien	68,685	60,148	8,537
Bibb	21,478	14,101	7,377
Bleckley	14,476	6,622	7,854
Brantley	96,692	88,515	8,177
Brooks	25,532	20,188	5,344
Bryan	100,648	96,461	4,187
Bulloch	37,679	29,761	7,918
Burke	27,563	19,919	7,644
Butts	24,893	22,621	2,272
Calhoun	21,366	19,498	1,868
Camden	117,012	94,833	22,179
Candler	16,165	13,985	2,180
Carroll	31,010	29,791	1,219
Catoosa	6,616	5,439	1,177
Charlton	100,847	98,107	2,740
Chatham	24,212	16,587	7,625
Chattahoochee	35,228	34,543	685
Chattooga	16,718	13,924	2,794
Cherokee	42,033	40,873	1,160
Clarke	1,227	1,192	35
Clay	14,799	13,037	1,762
Clayton	5,248	5,046	202
Clinch	148,134	148,092	42
Cobb	20,565	20,023	542
Coffee	79,453	76,380	3,073
Colquitt	23,587	22,291	1,296
Columbia	30,680	25,354	5,326
Cook	21,012	20,684	328
Coweta	52,484	51,428	1,056
Crawford	46,492	39,364	7,128
Crisp	14,880	13,728	1,152
Dade	741	666	75
Dawson	5,331	5,282	49
Decatur	26,753	22,430	4,323
De Kalb	6,501	6,341	160
Dodge	55,704	42,098	13,606
Dooly	16,804	10,944	5,860
Dougherty	62,267	58,978	3,289
Douglas	31,034	29,662	1,372
Early	27,795	24,238	3,557
Echols	117,064	116,303	761
Effingham	45,614	36,868	8,746
Elbert	70,074	67,066	3,008
Emanuel	70,826	67,010	3,816
Evans	20,190	19,660	530
Fannin	9,121	4,535	4,586
Fayette	13,614	13,357	257
Floyd	22,674	15,467	7,207
Forsyth	8,025	7,888	137
Franklin	16,497	14,129	2,368
Fulton	22,187	21,700	487
Gilmer	6,803	5,909	894
Glascock	8,186	6,583	1,603
Glynn	73,189	48,509	24,680
Gordon	20,344	19,236	1,108
Grady	31,695	27,347	4,348
Greene	62,812	56,656	6,156
Gwinnett	26,384	25,829	555
Habersham	13,939	7,922	6,017
Hall	18,911	18,529	382
Hancock	58,090	47,893	10,197
Haralson	23,749	21,596	2,153
Harris	72,989	70,964	2,025
Hart	5,597	4,617	980
Heard	32,599	32,340	259
Henry	35,744	30,884	4,860
Houston	33,087	24,802	8,285
Irwin	6,144	5,694	450
Jackson	24,900	24,205	695
Jasper	23,276	21,220	2,056
Jeff Davis	69,953	66,457	3,496
Jefferson	14,465	12,015	2,450
Jenkins	27,340	20,356	6,984
Johnson	39,051	22,892	16,159
Jones	59,781	54,001	5,780
Lamar	15,293	14,222	1,071
Lanier	30,900	30,520	380
Laurens	50,494	32,031	18,463
Lee	3,370	3,370	
Liberty	90,161	67,493	22,668
Lincoln	12,904	12,000	904
Long	38,602	37,838	764
Lowndes	48,044	44,503	3,541
Lumpkin	3,607	3,557	50
McDuffie	3,104	2,079	1,025
McIntosh	46,884	43,800	3,084
Macon	26,405	13,950	12,455
Madison	29,255	28,373	882
Marion	29,482	25,825	3,657
Meriwether	38,402	37,239	1,163
Miller	8,806	6,503	2,303
Mitchell	40,083	33,343	6,740
Monroe	53,020	47,640	5,380
Montgomery	28,225	27,981	244
Morgan	23,294	20,804	2,490
Murray	16,620	15,514	1,106
Muscogee	9,341	8,573	768
Newton	30,676	27,760	2,916
Oconee	23,740	20,441	3,299
Oglethorpe	41,953	39,108	2,845
Paulding	30,376	27,075	3,301
Peach	2,075	1,747	328
Pickens	20,838	19,859	979
Pierce	42,910	41,877	1,033
Pike	12,093	11,427	666
Polk	27,147	23,492	3,655
Pulaski	3,929	3,039	890
Putnam	49,754	45,219	4,535
Quitman	22,590	18,068	4,522
Rabun	4,291	639	3,652
Randolph	40,355	37,019	3,336
Richmond	7,057	5,798	1,259
Rockdale	2,289	2,235	54
Schley	6,089	3,760	2,329
Schreven	24,046	20,647	3,399
Seminole	8,303	4,964	3,339

Table 10. *Round pulpwood production in Georgia, 1967* (Continued)

County	All species	Pine	Hardwood
	Standard cords		
Spalding	12,371	11,957	414
Stephens	8,704	4,888	3,816
Stewart	48,977	48,286	691
Sumter	27,920	25,204	2,716
Talbot	44,537	37,084	7,453
Taliaferro	8,752	8,642	110
Tattnall	74,498	69,258	5,240
Taylor	21,766	19,905	1,861
Telfair	63,469	53,680	9,789
Terrell	15,420	14,511	909
Thomas	52,614	33,841	18,773
Tift	11,525	10,663	862
Toombs	39,441	34,744	4,697
Towns			
Treutlen	27,869	23,865	4,004
Troup	62,230	57,581	4,649
Turner	17,385	15,984	1,401
Twiggs	36,203	31,364	4,839
Union	2,727	1,814	913
Upson	38,014	35,632	2,382
Walker	11,486	9,945	1,541
Walton	18,144	15,394	2,750
Ware	145,147	144,688	459
Warren	22,058	19,523	2,535
Washington	48,429	34,613	13,816
Wayne	149,083	140,302	8,781
Webster	23,285	22,266	1,019
Wheeler	53,817	50,712	3,105
White	4,306	4,177	129
Whitfield	14,205	13,165	1,040
Wilcox	16,629	15,482	1,147
Wilkes	61,992	53,841	8,151
Wilkinson	33,614	27,684	5,930
Worth	32,266	29,860	2,406
All counties	5,425,783	4,840,402	585,381

Table 11. *Round pulpwood production in Louisiana, 1967*

Parish	All species	Pine	Hardwood
	Standard cords		
Acadia	6,154	4,008	2,146
Allen	39,515	34,013	5,502
Ascension	538	4	534
Assumption			
Avoyelles	3,741	3,447	294
Beauregard	20,327	19,503	824
Bienville	127,804	100,324	27,480
Bossier	81,417	46,764	34,653
Caddo	43,597	31,837	11,760
Calcasieu	16,739	13,601	3,138
Caldwell	34,235	27,022	7,213
Cameron			
Catahoula	14,730	4,273	10,457
Claiborne	82,550	66,937	15,613
Concordia	12,166	1	12,165
De Soto	73,617	42,734	30,883
East Baton Rouge	1,176	91	1,085
East Carroll	3,272		3,272
East Feliciana	18,670	14,229	4,441
Evangeline	16,268	11,651	4,617
Franklin	3,051	206	2,845
Grant	34,252	26,874	7,378
Iberia			
Iberville			
Jackson	96,072	85,273	10,799
Jefferson			
Jefferson Davis	1,568	724	844
Lafayette			
Lafourche			
La Salle	45,611	33,300	12,311
Lincoln	67,279	52,800	14,479
Livingston	111,306	90,531	20,775
Madison	21,525		21,525
Morehouse	74,060	32,816	41,244
Natchitoches	70,803	43,420	27,383
Orleans			
Ouachita	38,941	26,642	12,299
Plaquemines			
Pointe Coupee	14,203	7	14,196
Rapides	73,852	63,766	10,086
Red River	26,862	13,411	13,451
Richland	4,505	40	4,465
Sabine	83,356	64,839	18,517
St. Bernard			
St. Charles			
St. Helena	33,861	29,765	4,096
St. James			
St. John the Baptist			
St. Landry	8,792	665	8,127
St. Martin	2,056		2,056
St. Mary			
St. Tammany	55,221	53,005	2,216
Tangipahoa	69,507	62,441	7,066
Tensas	12,427		12,427
Terrebonne			
Union	159,072	109,678	49,394
Vermilion			
Vernon	48,763	34,809	13,954
Washington	112,009	88,607	23,402
Webster	55,001	32,855	22,146
West Baton Rouge	399	12	387
West Carroll	208	112	96
West Feliciana	6,823	1,190	5,633
Winn	121,687	104,809	16,878
All parishes	2,049,588	1,473,036	576,552

Table 12. *Round pulpwood production in Mississippi, 1967*

County	All species	Pine	Hardwood
	Standard cords		
Adams	17,714	2,831	14,883
Alcorn	11,864	10,558	1,306
Amite	52,074	44,905	7,169
Attala	35,043	11,906	23,137
Benton	10,806	6,741	4,065
Bolivar	37,340		37,340
Calhoun	15,209	12,393	2,816
Carroll	11,928	3,532	8,396
Chickasaw	14,602	12,333	2,269
Choctaw	18,404	12,582	5,822
Claiborne	31,254	5,124	26,130
Clarke	106,937	76,410	30,527
Clay	14,300	10,858	3,442
Coahoma	4,112		4,112
Copiah	56,056	38,145	17,911
Covington	25,961	13,143	12,818
De Soto	347		347
Forrest	43,591	31,315	12,276
Franklin	33,379	19,831	13,548
George	50,449	34,133	16,316
Greene	83,217	59,990	23,227
Grenada	6,544	4,428	2,116
Hancock	31,935	28,762	3,173
Harrison	36,234	34,600	1,634
Hinds	39,056	13,406	25,650
Holmes	38,380	8,908	29,472
Humphreys	10,170		10,170
Issaquena	7,396		7,396
Itawamba	21,963	21,098	865
Jackson	56,219	50,590	5,629
Jasper	67,905	52,872	15,033
Jefferson	44,584	28,455	16,129
Jefferson Davis	13,988	6,079	7,909
Jones	41,821	21,347	20,474
Kemper	58,861	37,975	20,886
Lafayette	22,424	13,244	9,180
Lamar	26,582	16,411	10,171
Lauderdale	94,934	65,648	29,286
Lawrence	17,428	10,775	6,653
Leake	27,200	10,999	16,201
Lee	1,756	1,591	165
Leflore	11,302	1,017	10,285
Lincoln	35,541	24,789	10,752
Lowndes	6,844	4,349	2,495
Madison	9,523	4,747	4,776
Marion	56,267	27,967	28,300
Marshall	10,134	7,284	2,850
Monroe	8,836	7,858	978
Montgomery	12,780	7,783	4,997
Neshoba	23,069	11,824	11,245
Newton	59,277	41,989	17,288
Noxubee	36,007	27,694	8,313
Oktibbeha	11,153	8,684	2,469
Panola	20,064	724	19,340
Pearl River	44,811	31,004	13,807
Perry	57,194	43,233	13,961
Pike	41,976	32,172	9,804
Pontotoc	6,737	4,425	2,312
Prentiss	13,236	12,158	1,078
Quitman	321		321
Rankin	50,032	33,664	16,368
Scott	43,137	30,498	12,639
Sharkey	1,377		1,377
Simpson	50,462	34,310	16,152
Smith	28,414	15,655	12,759
Stone	29,789	19,191	10,598
Sunflower			
Tallahatchie	1,540	135	1,405
Tate	5,343	1,399	3,944
Tippah	14,887	14,344	543
Tishomingo	28,370	21,528	6,842
Tunica	753		753
Union	8,563	5,153	3,410
Walthall	23,412	16,219	7,193
Warren	20,509	204	20,305
Washington	12,174		12,174
Wayne	115,383	83,406	31,977
Webster	18,397	8,482	9,915
Wilkinson	13,217	5,451	7,766
Winston	34,020	21,243	12,777
Yalobusha	27,602	15,199	12,403
Yazoo	13,548	677	12,871
All counties	2,345,968	1,460,377	885,591

Table 13. *Round pulpwood production in North Carolina, 1967*

County	All species	Pine	Hardwood
	Standard cords		
Alamance	6,316	4,741	1,575
Alexander	5,243	5,028	215
Alleghany	98	95	3
Anson	55,868	29,200	26,668
Ashe			
Avery	723		723
Beaufort	102,415	84,404	18,011
Bertie	62,403	47,958	14,445
Bladen	93,304	68,590	24,714
Brunswick	83,772	69,426	14,346
Buncombe	43,768	18,108	25,660
Burke	28,420	18,354	10,066
Cabarrus	8,188	6,154	2,034
Caldwell	12,649	8,662	3,987
Camden	4,592	3,567	1,025
Carteret	17,669	17,065	604
Caswell	7,006	6,720	286
Catawba	6,285	4,520	1,765
Chatham	45,546	27,060	18,486
Cherokee	28,171	18,774	9,397
Chowan	17,008	6,573	10,435
Clay			
Cleveland	12,544	8,990	3,554
Columbus	90,252	65,570	24,682
Craven	73,105	65,882	7,223
Cumberland	35,929	25,346	10,583
Currituck	3,641	2,507	1,134
Dare	9,770	8,566	1,204
Davidson	8,274	4,936	3,338
Davie	11,646	7,152	4,494
Duplin	47,811	32,540	15,271
Durham	23,449	21,036	2,413
Edgecombe	8,862	7,844	1,018
Forsyth	9,698	7,635	2,063
Franklin	76,441	46,025	30,416
Gaston	13,044	8,466	4,578
Gates	22,562	13,171	9,391
Graham	4,859	1,195	3,664
Granville	22,462	18,700	3,762
Greene	1,192	1,185	7
Guilford	12,472	12,161	311
Halifax	54,113	38,070	16,043
Harnett	18,843	9,445	9,398
Haywood	14,771	2,949	11,822
Henderson	19,728	6,507	13,221
Hertford	20,507	9,912	10,595
Hoke	29,085	26,017	3,068
Hyde	16,265	14,457	1,808
Iredell	34,081	23,747	10,334
Jackson	35,774	3,565	32,209
Johnston	19,877	10,414	9,463
Jones	39,131	35,556	3,575
Lee	17,581	9,500	8,081
Lenoir	15,631	15,568	63
Lincoln	3,377	2,819	558
McDowell	21,610	7,820	13,790
Macon	11,574		11,574
Madison	3,466	1,524	1,942
Martin	35,247	30,140	5,107
Mecklenburg	27,550	17,809	9,741
Mitchell	146		146
Montgomery	19,787	11,831	7,956
Moore	31,599	25,269	6,330
Nash	28,367	14,875	13,492
New Hanover	7,079	6,727	352
Northampton	22,693	15,533	7,160
Onslow	67,599	55,769	11,830
Orange	15,103	10,485	4,618
Pamlico	39,887	35,201	4,686
Pasquotank	6,628	5,345	1,283
Pender	55,562	41,414	14,148
Perquimans	10,855	7,005	3,850
Person	7,178	6,667	511
Pitt	16,932	15,506	1,426
Polk	13,935	5,276	8,659
Randolph	27,606	14,615	12,991
Richmond	27,269	19,688	7,581
Robeson	42,744	28,121	14,623
Rockingham	36,999	34,276	2,723
Rowan	8,840	6,457	2,383
Rutherford	35,296	23,584	11,712
Sampson	54,540	41,397	13,143
Scotland	12,904	8,990	3,914
Stanly	12,828	9,573	3,255
Stokes	4,944	4,323	621
Surry	28,184	25,587	2,597
Swain	7,943	4,638	3,305
Transylvania	17,282	3,062	14,220
Tyrrell	25,143	21,214	3,929
Union	36,383	17,263	19,120
Vance	12,960	11,355	1,605
Wake	53,589	38,841	14,748
Warren	49,965	42,122	7,843
Washington	12,397	7,987	4,410
Watauga			
Wayne	15,103	10,925	4,178
Wilkes	9,340	8,145	1,195
Wilson	4,580	2,981	1,599
Yadkin	8,121	7,837	284
Yancey	1,982		1,982
All counties	2,445,960	1,719,609	726,351

Table 14. *Round pulpwood production in Oklahoma, 1967*

County [1]	All species	Pine	Hardwood
	Standard cords		
Blaine	7,178		7,178
Caddo	3,135		3,135
Canadian	3,167		3,167
Cleveland	204		204
Custer	1,478		1,478
Dewey	165		165
Garvin	1,888		1,888
Grady	2,060		2,060
Jefferson	1,588		1,588
Kay	3,056		3,056
Latimer	7,082	7,082	
Le Flore	6,284	5,614	670
McClain	166		166
McCurtain	11,219	6,817	4,402
Muskogee	1,868		1,868
Okfuskee	67		67
Pontotoc	14		14
Rogers	3,958		3,958
Sequoyah	58		58
Stephens	468		468
Wagoner	3,958		3,958
Woods	156		156
All counties	59,217	19,513	39,704

[1] Counties with no pulpwood production are omitted.

Table 15. *Round pulpwood production in South Carolina, 1967*

County	All species	Pine	Hardwood
	Standard cords		
Abbeville	33,665	29,209	4,456
Aiken	63,691	55,693	7,998
Allendale	26,860	20,839	6,021
Anderson	37,667	26,819	10,848
Bamberg	12,490	8,837	3,653
Barnwell	17,650	16,358	1,292
Beaufort	16,000	12,080	3,920
Berkeley	103,156	76,585	26,571
Calhoun	15,044	13,601	1,443
Charleston	50,815	38,804	12,011
Cherokee	11,600	10,305	1,295
Chester	81,477	62,809	18,668
Chesterfield	56,750	37,299	19,451
Clarendon	43,200	24,298	18,902
Colleton	69,500	53,800	15,700
Darlington	34,905	19,968	14,937
Dillon	16,914	12,836	4,078
Dorchester	68,023	46,385	21,638
Edgefield	61,759	48,991	12,768
Fairfield	175,493	138,103	37,390
Florence	52,181	33,981	18,200
Georgetown	102,833	78,866	23,967
Greenville	13,619	10,929	2,690
Greenwood	59,867	52,582	7,285
Hampton	71,728	50,577	21,151
Horry	91,984	68,276	23,708
Jasper	43,593	27,666	15,927
Kershaw	90,414	65,543	24,871
Lancaster	66,280	48,792	17,488
Laurens	57,622	49,822	7,800
Lee	14,924	7,767	7,157
Lexington	30,029	26,273	3,756
McCormick	42,881	39,869	3,012
Marion	32,767	21,865	10,902
Marlboro	35,858	21,772	14,086
Newberry	93,350	77,944	15,406
Oconee	47,959	26,273	21,686
Orangeburg	36,552	25,822	10,730
Pickens	15,483	11,366	4,117
Richland	40,740	31,353	9,387
Saluda	36,328	26,893	9,435
Spartanburg	39,081	28,466	10,615
Sumter	37,951	27,404	10,547
Union	75,248	63,779	11,469
Williamsburg	88,915	55,758	33,157
York	56,506	42,811	13,695
All counties	2,371,352	1,776,068	595,284

Table 16. *Round pulpwood production in Tennessee, 1967*

County	All species	Pine	Hardwood
	Standard cords		
Anderson	6,122	3,547	2,575
Bedford			
Benton	465	459	6
Bledsoe	4,196	3,980	216
Blount	11,887	7,255	4,632
Bradley	14,912	10,882	4,030
Campbell	5,849	3,825	2,024
Cannon			
Carroll	261	261	
Carter	5,458	907	4,551
Cheatham			
Chester	1,966	1,909	57
Claiborne	3,247	850	2,397
Clay			
Cocke	9,258	6,426	2,832
Coffee	852	852	
Crockett			
Cumberland	19,945	3,236	16,709
Davidson			
Decatur	673	609	64
De Kalb			
Dickson			
Dyer			
Fayette			
Fentress	6,281	4,603	1,678
Franklin			
Gibson			
Giles			
Grainger	393		393
Greene	158	39	119
Grundy	1,631	1,631	
Hamblen	95		95
Hamilton	8,703	4,285	4,418
Hancock	1,549	170	1,379
Hardeman	2,266	2,253	13
Hardin	18,455	5,492	12,963
Hawkins	3,839		3,839
Haywood			
Henderson	3,658	3,649	9
Henry	888	888	
Hickman	4	4	
Houston			
Humphreys			
Jackson			
Jefferson	16		16
Johnson	1,313		1,313
Knox	3,766	1,266	2,500
Lake			
Lauderdale			
Lawrence	406	396	10
Lewis	324	324	
Lincoln			
Loudon	8,482	2,847	5,635
McMinn	19,689	13,682	6,007
McNairy	7,620	6,064	1,556
Macon			
Madison	668	668	
Marion			
Marshall			
Maury			
Meigs	12,538	7,802	4,736
Monroe	19,778	11,320	8,458
Montgomery			
Moore			
Morgan	25,860	4,260	21,600
Obion	147		147
Overton	4,539	1,287	3,252
Perry	316	107	209
Pickett			
Polk	14,721	9,178	5,543
Putman	12,122	2,387	9,735
Rhea	10,648	4,250	6,398
Roane	10,144	3,634	6,510
Robertson			
Rutherford			
Scott	12,686	4,631	8,055
Sequatchie	2,105	840	1,265
Sevier	5,652	5,441	211
Shelby	83		83
Smith			
Stewart			
Sullivan	11,232		11,232
Sumner			
Tipton			
Trousdale			
Unicoi	3,210	907	2,303
Union	6,995	4,921	2,074
Van Buren			
Warren			
Washington	4,904	1,814	3,090
Wayne	2,651	1,199	1,452
Weakley	409	409	
White	469		469
Williamson			
Wilson			
All counties	336,504	157,646	178,858

Table 17. *Round pulpwood production in Texas, 1967*

County [1]	All species	Pine	Hardwood
	----- *Standard cords* -----		
Anderson	11,154	9,396	1,758
Angelina	51,916	47,144	4,772
Bowie	18,047	17,901	146
Brazos	47		47
Camp	5,045	4,546	499
Cass	49,114	36,654	12,460
Chambers	7,369	7,077	292
Cherokee	55,318	45,446	9,872
Fort Bend	98	12	86
Gregg	3,378	2,283	1,095
Grimes	11,381	8,769	2,612
Hardin	37,388	15,769	21,619
Harris	34,814	27,623	7,191
Harrison	33,244	24,875	8,369
Henderson	4,200	4,200	
Houston	36,596	31,022	5,574
Jasper	79,440	62,334	17,106
Jefferson	2,611	2,001	610
Liberty	56,664	34,304	22,360
Madison	48		48
Marion	26,672	16,385	10,287
Montgomery	81,845	60,525	21,320
Morris	11,803	2,166	9,637
Nacogdoches	60,256	56,389	3,867
Newton	59,758	33,075	26,683
Orange	13,613	11,704	1,909
Panola	50,938	47,687	3,251
Polk	77,070	61,755	15,315
Red River	1,240		1,240
Rusk	46,149	38,831	7,318
Sabine	51,171	36,985	14,186
San Augustine	67,065	54,040	13,025
San Jacinto	37,469	24,362	13,107
Shelby	95,752	71,324	24,428
Smith	1,632	1,582	50
Titus	7		7
Trinity	60,855	51,977	8,878
Tyler	75,132	56,500	18,632
Upshur	41,586	40,564	1,022
Walker	47,512	35,787	11,725
Waller	197	27	170
Wood	4,341	4,282	59
All counties	1,409,935	1,087,303	322,632

[1] Counties with no pulpwood production are omitted.

Table 18. *Round pulpwood production in Virginia, 1967*

County [1]	All species	Pine	Hardwood
	Standard cords		
Accomack	12,505	12,207	298
Albemarle	35,894	19,856	16,038
Alleghany	48,367	8,197	40,170
Amelia	36,792	28,389	8,403
Amherst	41,167	9,346	31,821
Appomattox	62,733	28,072	34,661
Arlington	72	72	
Augusta	32,399	19,032	13,367
Bath	32,630	3,160	29,470
Bedford	44,303	20,686	23,617
Bland	88	48	40
Botetourt	28,986	6,074	22,912
Brunswick	89,035	72,407	16,628
Buchanan	2	2	
Buckingham	111,016	42,942	68,074
Campbell	60,307	33,694	26,613
Caroline	28,161	27,047	1,114
Carroll	1,210	1,159	51
Charles City	27,750	19,757	7,993
Charlotte	27,627	19,205	8,422
Chesterfield	28,035	24,983	3,052
Clarke	124	116	8
Craig	15,272	3,546	11,726
Culpeper	4,740	4,655	85
Cumberland	27,725	17,673	10,052
Dickenson			
Dinwiddie	67,850	59,640	8,210
Elizabeth City			
Essex	19,808	19,274	534
Fairfax	2,508	2,329	179
Fauquier	10,541	10,475	66
Floyd	2,768	2,047	721
Fluvanna	20,454	11,940	8,514
Franklin	25,496	19,684	5,812
Frederick	9,754	6,369	3,385
Giles	28	28	
Gloucester	21,993	20,847	1,146
Goochland	30,190	23,334	6,856
Grayson	809		809
Greene	3,103	2,313	790
Greensville	56,313	44,837	11,476
Halifax	10,982	10,218	764
Hanover	19,123	14,557	4,566
Henrico	6,896	5,505	1,391
Henry	22,432	20,553	1,879
Highland	7,537	474	7,063
Isle of Wight	16,416	6,244	10,172
James City	14,321	13,168	1,153
King and Queen	40,124	36,050	4,074
King George	559	390	169
King William	28,053	25,132	2,921
Lancaster	6,599	6,400	199
Lee	739		739
Loudoun	61	61	
Louisa	23,055	14,677	8,378
Lunenburg	31,712	27,917	3,795
Madison	548	456	92
Mathews	5,737	5,201	536
Mecklenburg	23,712	21,225	2,487
Middlesex	8,740	7,863	877
Montgomery	1,446	872	574
Nansemond	19,397	9,517	9,880
Nelson	51,004	22,958	28,046
New Kent	18,050	15,511	2,539
Norfolk	1,312	740	572
Northampton	176	112	64
Northumberland	3,306	3,069	237
Nottoway	23,448	18,027	5,421
Orange	14,376	12,562	1,814
Page	697	687	10
Patrick	4,192	3,990	202
Pittsylvania	49,651	40,014	9,637
Powhatan	10,906	7,757	3,149
Prince Edward	45,991	27,188	18,803
Prince George	63,351	57,056	6,295
Prince William	12,802	12,325	477
Princess Anne	2,202	2,039	163
Pulaski	1,162	835	327
Rappahannock	2,516	2,498	18
Richmond	10,800	10,624	176
Roanoke	2,983	1,681	1,302
Rockbridge	29,772	6,374	23,398
Rockingham	7,720	5,820	1,900
Russell	698		698
Scott	6,597		6,597
Shenandoah	6,517	4,311	2,206
Smyth	2,588	29	2,559
Southampton	40,566	19,566	21,000
Spotsylvania	14,504	12,885	1,619
Stafford	4,998	4,734	264
Surry	26,261	14,123	12,138
Sussex	49,473	29,835	19,638
Tazewell	23		23
Warren	3,896	3,837	59
Warwick	1,069	792	277
Washington	5,069		5,069
Westmoreland	10,822	10,749	73
Wise	5,336		5,336
Wythe	1,257	514	743
York	6,086	5,707	379
All counties	1,898,921	1,230,871	668,050

[1] Includes independent cities.

Table 19. *Mills using southern pulpwood in 1967, by process and capacity*

Location	Map code [1]	Company	Pulping capacity, 24 hours [2]				
			All processes	Sulfate	Groundwood and other mechanical	Semi-chemical	Soda and sulfite
			Tons				
ALABAMA							
Mahrt	(1)	Alabama Kraft Co., Div. Ga. Kraft Co.	800	800			
Jackson	(2)	Allied Paper Corp.	400	400			
Naheola	(3)	American Can Co.	750	750			
Brewton	(4)	Container Corp. of America	600	600			
Mobile	(5)	General Aniline and Film Corp.	48		48		
Demopolis	(6)	Gulf States Paper Corp.	400	400			
Tuscaloosa	(7)	Gulf States Paper Corp.	450	450			
Riverdale	(8)	Hammermill Paper Co., Riverdale Div.	400	400			
Mobile	(9)	International Paper Co.	1,315	1,015	300		
Coosa Pines	(10)	Kimberly-Clark Corp. Coosa River Newsprint Div.	1,590	650	940		
Mobile	(11)	National Gypsum Co.	300		150	150	
Mobile	(12)	Scott Paper Co.	1,400	1,400			
Montgomery	(13)	Union Camp Corp.	870	870			
		Total	9,323	7,735	1,438	150	
ARKANSAS							
Morrilton	(14)	Arkansas Kraft Corp.	250	250			
Pine Bluff	(15)	Dierks Paper Co.	150	150			
Crossett	(16)	Georgia-Pacific Corp. Crossett Division-Paper	835	835			
Camden	(17)	International Paper Co.	688	688			
Pine Bluff	(18)	International Paper Co.	1,300	900	400		
Little Rock	(19)	Superwood Corp. of Arkansas	75		75		
		Total	3,298	2,823	475		
FLORIDA							
Jacksonville	(20)	Alton Box Board Co.	625	625			
Foley	(21)	The Buckeye Cellulose Corp.	923	923			
Blountstown	(22)	Coastal Products Corp.	90		90		
Fernandina Beach	(23)	Container Corp. of America	800	800			
Palatka	(24)	Hudson Pulp and Paper Corp.	925	925			
Panama City	(25)	International Paper Co.	1,300	1,300			
Fernandina Beach	(26)	Rayonier Inc.	375				375
Port St. Joe	(27)	St. Joe Paper Co.	1,700	1,700			
Jacksonville	(28)	St. Regis Paper Co.	1,400	1,400			
Pensacola	(29)	St. Regis Paper Co.	900	900			
		Total	9,038	8,573	90		375
GEORGIA							
Macon	(30)	Armstrong Cork Co.	400		400		
Brunswick	(31)	Brunswick Pulp and Paper Co.	1,175	1,175			
Savannah	(32)	Certain-teed Products Corp.	65			65	
Augusta	(33)	Continental Can Co., Inc.	700	700			
Port Wentworth	(34)	Continental Can Co., Inc.	600	600			
Augusta	(35)	Cox Newsprint, Inc.	375		375		
Savannah	(36)	General Aniline and Film Corp.	48		48		
Macon	(37)	Georgia Kraft Co., Mead Div.	850	850			
Rome	(38)	Georgia Kraft Co., Krannert Div.	1,500	1,500			
St. Marys	(39)	Gilman Paper Co., St. Marys Kraft Div.	1,000	1,000			
Cedar Springs	(40)	Great Northern Paper Co., Southern Div.	1,700	1,700			
Valdosta	(41)	Owens-Illinois, Forest Products Div.	815	815			
Jesup	(42)	Rayonier Inc.	675	675			
Savannah	(43)	Union Camp Corp.	3,000	2,600		400	
		Total	12,903	11,615	823	465	
ILLINOIS							
East St. Louis	(44)	Certain-teed Products Corp.	85		85		
		Total	85		85		
LOUISIANA							
Shreveport	(45)	Bird and Son, Inc.	60			60	
Elizabeth	(46)	Calcasieu Paper Co., Inc.	240	240			
Hodge	(47)	Continental Can Co., Inc.	750	550		200	
Bogalusa	(48)	Crown Bellerbach Corp.	1,435	1,300		135	
St. Francisville	(49)	Crown Zellerbach Corp.	500	500			
Bastrop	(50)	International Paper Co. (Bastrop Mill)	485			485	
Bastrop	(51)	International Paper Co. (Louisiana Mill)	950	950			
Springhill	(52)	International Paper Co.	1,625	1,625			
West Monroe	(53)	Olinkraft, Inc.	1,000	1,000			
St. Francisville	(54)	St. Francisville Paper Co.	235		235		
		Total	7,280	6,165	235	880	
MARYLAND							
Luke	(55)	West Virginia Pulp and Paper Co.	800	800			
		Total	800	800			

Table 19. *Mills using southern pulpwood in 1967, by process and capacity* (Continued)

Location	Map code [1]	Company	Pulping capacity, 24 hours [2]				
			All processes	Sulfate	Groundwood and other mechanical	Semi-chemical	Soda and sulfite
			Tons				
MISSISSIPPI							
Meridian	(56)	The Flintkote Co.	165		165		
Moss Point	(57)	International Paper Co.	660	660			
Natchez	(58)	International Paper Co.	950	950			
Vicksburg	(59)	International Paper Co.	1,000	1,000			
Natchez	(60)	Johns-Manville Products Corp.	350		230	120	
Meridian	(61)	Kroehler Mfg. Co. of Miss., Inc.	80		80		
Laurel	(62)	Masonite Corp.	1,200		1,200		
Greenville	(63)	United States Gypsum Co.	200		200		
		Total	4,605	2,610	1,875	120	
MISSOURI							
Kansas City	(64)	General Aniline and Film Corp.	100		100		
		Total	100		100		
NORTH CAROLINA							
Roanoke Rapids	(65)	Albemarle Paper Co.	890	890			
Sylva	(66)	The Mead Corp.	290			290	
Riegelwood	(67)	Riegel Paper Corp.	1,000	1,000			
Canton	(68)	U. S. Plywood-Champion Papers Inc.	1,225	1,225			
Plymouth	(69)	Weyerhaeuser Co., N. C. Div.	1,500	1,250		250	
		Total	4,905	4,365		540	
OHIO							
Chillicothe	(70)	The Mead Corp.	570	570			
		Total	570	570			
OKLAHOMA							
Broken Bow	(71)	Dierks Forests, Inc.	420		420		
Pryor	(72)	Georgia-Pacific, Bestwall Gypsum Div.	45		45		
		Total	465		465		
PENNSYLVANIA							
Roaring Spring	(73)	Combined Paper Mills, Inc.	180	180			
Erie	(74)	Hammermill Paper Co.	400			61	339
Johnsonburg	(75)	New York and Pennsylvania Co., Inc.	270	160			110
Tyrone	(76)	West Virginia Pulp and Paper Co.	153	153			
		Total	1,003	493		61	449
SOUTH CAROLINA							
Catawba	(77)	Bowaters Carolina Corp.	700	600	100		
Georgetown	(78)	International Paper Co.	2,130	1,650		480	
Hartsville	(79)	Sonoco Products Co.	320			320	
Florence	(80)	South Carolina Industries, Inc.	600	600			
Charleston	(81)	West Virginia Pulp and Paper Co.	1,950	1,950			
		Total	5,700	4,800	100	800	
TENNESSEE							
Calhoun	(82)	Bowaters Southern Paper Corp.	1,475	450	850	175	
Harriman	(83)	The Mead Corp.	180			180	
Kingsport	(84)	The Mead Corp.	260				260
Knoxville	(85)	Southern Extract Co.	150			150	
Counce	(86)	Tennessee River Pulp and Paper Co.	700	700			
		Total	2,765	1,150	850	505	260
TEXAS							
Evadale	(87)	EasTex, Inc.	1,200	1,200			
Dallas	(88)	General Aniline and Film Corp.	40		40		
Orange	(89)	Owens-Illinois, Forest Products Div.	900	900			
Lufkin	(90)	Southland Paper Mills, Inc.	1,250	400	850		
Sheldon	(91)	Southland Paper Mills, Inc.	860	500	360		
Diboll	(92)	Temple Industries, Fiber Products Div.	195			195	
Pasadena	(93)	U. S. Plywood-Champion Papers Inc.	930	850	80		
		Total	5,375	3,850	1,330	195	
VIRGINIA							
West Point	(94)	The Chesapeake Corp. of Virginia	1,050	1,050			
Hopewill	(95)	Continental Can Co., Inc.	1,000	830		170	
Lynchburg	(96)	The Mead Corp.	190			190	
Big Island	(97)	Owens-Illinois, Forest Products Div.	400			400	
Jarratt	(98)	Southern Johns-Manville Products Corp.	200		200		
Franklin	(99)	Union Camp Corp.	690	690			
Covington	(100)	West Virginia Pulp and Paper Co.	1,340	1,060		280	
		Total	4,870	3,630	200	1,040	
		All States	73,085	59,179	8,066	4,756	1,084

[1] Corresponds to numbers at mill locations in figure 8.
[2] Southern Pulp and Paper Manufacturer, vol. 30, No. 10 (Oct. 1, 1967); and other sources.

Table 20. *Pulpmills under construction in the South*

Location	Map code [1]	Company	Pulp capacity 24 hrs.
			Tons
ALABAMA			
Pine Hill	(101)	MacMillan Bloedel United, Inc.	750
ARKANSAS			
Ashdown	(102)	Nekoosa-Edwards Paper Co.	400
GEORGIA			
Riceboro	(103)	Interstate Paper Corp.	400
LOUISIANA			
Port Hudson	(104)	Louisiana Forest Products Corp.	400
Pineville	(105)	Pineville Kraft Corp.	750
MISSISSIPPI			
Monticello	(106)	St. Regis Paper Co.	1,535
NORTH CAROLINA			
New Bern	(107)	Weyerhaeuser Co.	600
SOUTH CAROLINA			
Beech Island	(108)	Kimberly-Clark Corp.	500

[1] Corresponds to numbers at mill locations in figure 8.

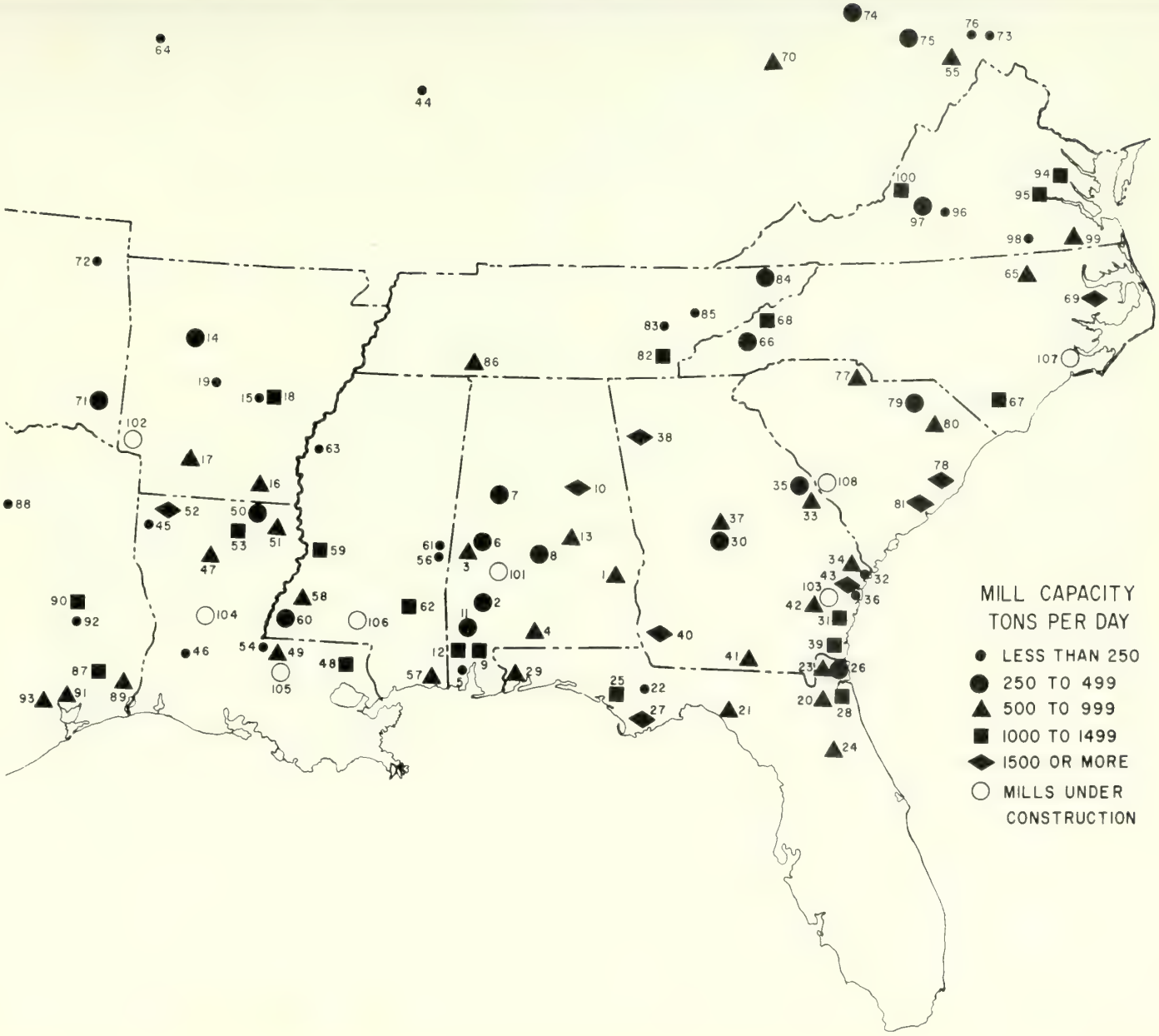


Figure 8. *Mills using southern pulpwood in 1967, and those under construction. Numbers at mill locations correspond to numbers in tables 19 and 20.*

U.S.D.A. Forest Service Resource Bulletin SE-11

SOUTHEASTERN FOREST EXPERIMENT STATION
Asheville, North Carolina

Forest Service, U. S. Department of Agriculture

1968

U.S.D.A. Forest Service Resource Bulletin SE-12 October 1968

FOREST STATISTICS for the SOUTHERN COASTAL PLAIN of SOUTH CAROLINA 1968

CLEMSON UNIV.
DEC 8
S. TECH. & AGR. DIV.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SOUTHEASTERN FOREST EXPERIMENT STATION
ASHEVILLE, NORTH CAROLINA

FOREWORD

This report highlights the principal findings of the fourth Forest Survey in the Southern Coastal Plain of South Carolina, completed in July 1968. Findings of the three earlier surveys, completed in 1936, 1947, and 1958, provide the basis for measuring the changes that have occurred and the trends that have developed over the past 30 years.

Forest Survey, authorized by the McSweeney-McNary Forest Research Act of May 22, 1928, as amended, is a continuing nationwide undertaking by the regional experiment stations of the U. S. Forest Service. In Florida, Georgia, North Carolina, South Carolina, and Virginia, Forest Survey is an activity of the Southeastern Forest Experiment Station, with headquarters at Asheville, North Carolina. The general objective is to inventory periodically forest lands, their extent, condition, and volume of timber, and to ascertain rates of forest growth and depletion. It is necessary to keep this basic information up to date to provide a sound basis for the formulation of forest policies and programs.

The 12-county area covered by this report is one of three Survey units in South Carolina. Similar reports for the Piedmont and Northern Coastal Plain have been published, and copies are available at the Southeastern Station. A Statewide statistical report is now being prepared and will contain additional data along with a comprehensive analysis of the findings.

Joe P. McClure, Project Leader, organized and coordinated the various phases of the Southern Coastal Plain Survey. Noel D. Cost was in charge of data collection. William H. B. Haines supervised the aerial photo preparation and interpretation and the data computations. Richard L. Welch was responsible for compiling timber removal and mortality information. Herbert A. Knight was in charge of analysis and reporting.

Office personnel assisting in this report were:

Robert A. Cathey
Bertie W. Greene
Cecil C. Hutchins, Jr.
Joanne Hutchison
Doniev W. Jackson
Ruth E. McIntyre
Agnes C. Nichols
Louise Shuford
Sammy S. Wenningham
Dorothy S. White
Camilla E. Young

The field party included:

John D. Nesbit, Field Supervisor
Thomas R. Bellamy, Field Assistant

Edgar L. Davenport
Jeffrey E. Dukes
Leonard G. Edwards
Robert S. Hensley
Roy C. Henson
Harold D. Mathews
Bruce E. Mullin
David L. Pait
John F. Parlier, Jr.
Douglas R. Phillips
Nolan L. Snyder
Richard J. White, Jr.
Lawrence C. Wilson

Walton R. Smith

WALTON R. SMITH, Assistant Director
Division of Marketing, Utilization,
and Resources Research

FOREST STATISTICS
for the
SOUTHERN COASTAL PLAIN of SOUTH CAROLINA
1968

by

NOEL D. COST, ASSOCIATE RESOURCE ANALYST

CONTENTS

Page

HIGHLIGHTS - 1

HOW THE FOREST SURVEY IS MADE - - - - - - - - - - - - - - - - - - 3

RELIABILITY OF THE DATA - 4

DEFINITION OF TERMS - 5

COUNTY TABLES:

1. Area, by land class - 13
2. Area of commercial forest land, by ownership class - - - - - 14
3. Area of commercial forest land, by forest type group - - - - 15
4. Area of commercial forest land, by stand-size class - - - - 16
5. Area of commercial forest land, by site class - - - - - - - 17
6. Area of commercial forest land, by stocking classes of growing-stock trees - 18
7. Volume of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - - - - 19
8. Net annual growth of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - 20
9. Annual removals of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - 21

UNIT TABLES:

10. Area of commercial forest land, by forest type and ownership class - 22
11. Area of commercial forest land, by ownership and stocking classes of growing-stock trees - - - - - - - - - - - - - - - 22
12. Volume of timber on commercial forest land, by class and species group - 23
13. Number of growing-stock trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - 24
14. Volume of all live trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - 25
15. Volume of growing stock on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - 26
16. Volume of sawtimber on commercial forest land, by species and diameter class - 27
17. Net annual growth and removals of growing stock on commercial forest land, by species - - - - - - - - - - - - - - - 28
18. Net annual growth and removals of sawtimber on commercial forest land, by species - - - - - - - - - - - - - - - - - - 29
19. Annual mortality of growing stock and sawtimber on commercial forest land, by species - - - - - - - - - - - - - - - 30
20. Volume of all live trees and growing stock on commercial forest land, by ownership class and species group - - - - - 31
21. Volume of sawtimber on commercial forest land, by ownership class and species group - - - - - - - - - - - - - - - - 31
22. Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group - - 32
23. Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group - - - - - 32
24. Average net volume per acre of sawtimber, growing stock, and cull timber on commercial forest land, by ownership class, major forest type, and species group - - - - - - - - 33
25. Land area, by class, major forest type, and survey completion date - 34
26. Volume of sawtimber, growing stock, and all timber on commercial forest land, by species group, diameter class, and survey completion date - - - - - - - - - - - - - - - - - - - 35

HIGHLIGHTS

Since 1958 in the Southern Coastal Plain of South Carolina--

--area of commercial forest has increased by 156,500 acres, or 5 percent. Commercial forest land totals almost 3.3 million acres, or 63 percent of the total land area. Especially noticeable is the reversion of over 250,000 acres of former agricultural lands to forest. In contrast, over 104,000 acres of commercial forest were lost to other land uses. Most of this loss was to agricultural uses, but over one-third went to urban development.

--area in pine and oak-pine cover types has increased 14 percent and now makes up about 55 percent of the commercial forest. In contrast, the area in hardwood cover types has decreased almost 4 percent. Oak-gum-cypress, with over 800,000 acres, is the leading cover type, followed by loblolly pine, which occupies slightly over 500,000 acres.

--area of commercial forest land owned by farm operators decreased 13 percent while miscellaneous private holdings increased 88 percent. Commercial forest land owned by farm operators was reduced by 245,000 acres, most of which presumably shifted to the miscellaneous private category. Collectively, farmers and miscellaneous private owners now own 2.6 million acres, or 80 percent of the commercial forest. Area in public ownership is up slightly, and forest industry holdings have declined.

--sapling and seedling stands have increased by 167,700 acres, largely the result of natural reversion and planting. Acreage in poletimber stands has remained about the same, and sawtimber stands have increased by 87,000 acres. The area in nonstocked forest land is down from 355,600 to 227,000 acres. About 15 percent of all stands in this 12-county area originated wholly or in part from artificial regeneration.

--average stand density, measured in basal area per acre, of all live trees 5.0 inches d.b.h. and larger has increased from 47 to 54 square feet. Still, only one acre in eight is fully stocked with growing-stock trees, and over one-third of the stands are poorly stocked. This indicates that the current net growth, which averages about 50 cubic feet per acre annually, could be increased substantially.

--volume of softwood growing stock, primarily pine, increased from 1.2 to 1.5 billion cubic feet, or almost 29 percent, reversing a downward trend in softwood volume between 1947 and 1958. Volume of softwood sawtimber is up almost 24 percent compared to a 7-percent de-

crease between 1947 and 1958. Most of the recent increase in sawtimber volume was in loblolly and longleaf pines. In pole-timber trees, loblolly and slash pine accounted for most of the increase in volume, largely in the form of ingrowth from some of the older pine plantations.

--volume of hardwood growing stock has continued to increase, and at a faster rate than between the two previous surveys. Volume of hardwood growing stock is up 10 percent, compared to a 2-percent increase between 1947 and 1958. Volume of hardwood sawtimber is up 9 percent, which reverses a downward trend in hardwood sawtimber volume between 1947 and 1958. The red oaks as a group made up most of the increase. Tupelo and blackgum, however, which are the leading hardwood species in the area in terms of volume, made very small gains.

In 1967--

--public and forest industry holdings produced almost 29 percent of the net growth of growing stock, although these holdings account for only 20 percent of the area of commercial forest land. This indicates that these lands are responding to somewhat more intensive management than is generally practiced on the farmer and miscellaneous private holdings. This finding also emphasizes, however, that collectively, the farmer and miscellaneous private lands still provide 71 percent of the net growth.

--net growth of growing stock exceeded removals by an estimated 51.2 million cubic feet, or 46 percent. Over 60 percent of this growth over removal was pine, about 21 percent was oak, with cypress and miscellaneous hardwood species accounting for the remaining 19 percent. By ownership, 65 percent of the excess growth was on farmer and miscellaneous private holdings, 18 percent on public holdings, and the remaining 17 percent on forest industry lands.

--net growth of sawtimber exceeded removals by an estimated 157.3 million board feet, or 39 percent. The breakdowns of this surplus growth by species and ownership follow closely the breakdowns of growing stock.

--mortality of growing stock was estimated to total 24.7 million cubic feet, which reduced the gross growth by about 13 percent. Over two-thirds of the mortality was hardwood, and suppression and climatic factors were the leading identifiable causes of death.

HOW THE FOREST SURVEY IS MADE

The method of survey is essentially a sampling procedure designed to provide reliable statistics primarily at the State and Survey Unit levels. Individual county statistics are presented to permit adding any combination of counties together until the total is large enough to meet the desired degree of reliability. The basic steps of the survey procedure were as follows:

1. Initial estimates of forest and nonforest areas were based on the classification of 30,219 sample points systematically spaced on the latest aerial photographs available.

2. The initial estimates of area by land-use class were either verified or adjusted on the basis of a ground check at 1,789 of these sample points.

3. Estimates of timber volume and forest classifications were based on measurements recorded at 1,144 of the ground check locations which fell within commercial forest land. A 10-point cluster of plots systematically spaced on an acre were measured at each of these sample locations using a basal area factor of 37.5 square feet per acre. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

4. Equations prepared from detailed measurements collected on the trees tallied at one out of every 20 sample locations were used to compute the volumes of individual tally trees. A mirror caliper and sectional aluminum poles were used to obtain the additional measurements on standing trees required to construct the volume equations. The same 5-percent subsample of plots used for the tree-volume study also served as a quality control of field measurements. Felled trees were measured at active cutting operations to provide utilization factors for product and species groups and to supplement the standing tree-volume study.

5. Permanent sample plots established in 1958 were reconstructed where possible, and their remeasurement provided the primary estimates of growth, removal, and mortality.

6. Ownership information was collected from local contacts, correspondence, and public records. In those counties where the sample missed a particular ownership class, temporary sample plots were added and measured to describe the forest conditions within the ownership class.

7. All field data were sent to Asheville for editing and were punched in cards and stored on magnetic tape for machine computing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

RELIABILITY OF THE DATA

Statistical analysis of these data indicates a sampling error of ±0.8 percent for the estimate of total commercial forest area, 3.2 percent for total cubic volume, and 2.7 percent for cubic growth. As these totals are broken down by county, forest type, species, tree diameter, and other subdivisions, the sampling error increases. The order of this increase is suggested in the following tabulation which shows the sampling error to which the estimates are liable, in terms of one standard error.

Forest area	Sampling error[1]	Cubic volume	Sampling error[1]	Net cu.-ft. growth	Sampling error[1]
Thousand acres	Percent	Million cu. ft.	Percent	Million cu. ft.	Percent
3,269.4	0.8				
2,092.4	1.0				
523.1	2.0			163.4	2.7
232.5	3.0	3,281.7	3.2	132.4	3.0
130.8	4.0	2,100.3	4.0	74.4	4.0
83.7	5.0	1,344.2	5.0	47.6	5.0
20.9	10.0	336.0	10.0	11.9	10.0
9.3	15.0	149.4	15.0	5.3	15.0
5.2	20.0	84.0	20.0	3.0	20.0
3.3	25.0	53.8	25.0	1.9	25.0

1/ By random-sampling formula.

DEFINITIONS OF TERMS

Acceptable trees.--Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.

Basal area.--The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand usually expressed as square feet of basal area per acre.

Commercial forest land.--Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

Commercial species.--Tree species presently or prospectively suitable for industrial wood products.

Cropland.--Land under cultivation within the past 24 months, including orchards and land in soil-improving crops, but excluding land cultivated in developing improved pasture. Also includes idle farmland.

Desirable trees.--Growing-stock trees of commercial species having no serious defects in quality limiting present or prospective use for timber products, of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age.

Diameter class.--A classification of trees based on diameter outside bark, measured at breast height ($4\frac{1}{2}$ feet above the ground). D.b.h. is the common abbreviation for "diameter at breast height." Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h., inclusive.

Farm.--Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totaled $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for the year amounted to at least $250.

Farm operator.--A person who operates a farm, either doing the work himself or directly supervising the work.

Farmer-owned lands.--Lands owned by farm operators.

Forest industry lands.--Lands owned by companies or individuals operating wood-using plants.

Forest land.--Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest type.--A classification of forest land based upon the species forming a plurality of live-tree stocking.

White pine-hemlock.--Forests in which eastern white pine or hemlock, singly or in combination, comprises a plurality of the stocking. (Common associates include birch and maple.)

Longleaf-slash pine.--Forests in which longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Loblolly-shortleaf pine.--Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Oak-pine.--Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.--Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress.--Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprises a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood.--Forests in which elm, ash, or cottonwood, singly or in combination, comprises a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Gross growth.--Annual increase in net volume of trees in the absence of cutting and mortality.

Growing-stock trees.--Live trees of commercial species qualifying as desirable or acceptable trees.

Growing-stock volume.--Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs.

Hardwoods.--Dicotyledonous trees, usually broad-leaved and deciduous.

Soft hardwoods.--Soft-textured hardwoods such as boxelder, red and silver maple, buckeye, hackberry, loblolly-bay, silverbell (in mts.), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm.

Hard hardwoods.--Hard-textured hardwoods such as Florida and sugar maple, birch, hickory, dogwood, persimmon (forest grown), beech, ash, honeylocust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Idle farmland.--Includes former croplands, orchards, improved pastures and farm sites not tended within the past two years, and presently less than 16.7 percent stocked with trees.

Improved pasture.--Land currently improved for grazing by cultivation, seeding, irrigation, or clearing of trees or brush.

Industrial wood.--All roundwood products except fuelwood.

Land area.

Bureau of the Census.--The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area.

Forest Survey.--The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet, and minimum size of lakes, etc., is 1 acre.

Logging residues.--The unused portions of trees cut or killed by logging.

Miscellaneous Federal lands.--Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

Miscellaneous private lands - corporate.--Lands owned by private corporations other than forest industry.

Miscellaneous private lands - individual.--Privately owned lands other than forest-industry, farmer-owned, or corporate lands.

Mortality.--Number or sound-wood volume of live trees dying from natural causes during a specified period.

National Forest land.--Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Net annual growth.--The increase in volume of a specified size class for a specific year.

Net volume.--Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial forest land.--(a) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and (b) productive-reserved forest land.

Noncommercial species.--Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land.--Land that has never supported forests and lands formerly forested where use for timber management is precluded by development for other uses.

Nonstocked land.--Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Other Federal lands.--Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

Other public lands.--Publicly-owned lands other than National Forests.

Overstocked areas.--Areas where growth of trees is significantly reduced by excessive numbers of trees.

Poletimber trees.--Growing-stock trees of commercial species at least 5.0 inches in d.b.h. but smaller than sawtimber size.

Productive-reserved forest land.--Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation.

Rangeland.--Land on which the natural plant cover is composed principally of native grasses, forbs, or shrubs valuable for forage.

Rotten trees.--Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively and/or do not meet Regional specifications for freedom from defect primarily because of rot.

Rough trees.--(a) Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively and/or do not meet Regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Salvable dead trees.--Standing or down dead trees that are considered merchantable by Regional standards.

Saplings.--Live trees 1.0 inch to 5.0 inches in diameter at breast height.

Saw log.--A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, and with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods), or other combinations of size and defect specified by Regional standards.

Saw-log portion.--That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.--The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber trees.--Live trees of commercial species containing at least a 12-foot saw log and meeting Regional specifications for freedom from defect. Softwoods must be at least 9.0 inches and hardwoods at least 11.0 inches in diameter at breast height.

Sawtimber volume.--Net volume of the saw-log portion of live sawtimber in board-foot International 1/4-inch rule.

Seedlings.--Live trees less than 1.0 inch in diameter at breast height that are expected to survive according to Regional standards.

Site class.--A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Class 1.--Sites capable of producing 165 or more cubic feet per acre annually.

Class 2.--Sites capable of producing 120 to 165 cubic feet per acre annually.

Class 3.--Sites capable of producing 85 to 120 cubic feet per acre annually.

Class 4.--Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 5.--Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

Softwoods.--Coniferous trees, usually evergreen, having needles or scale-like leaves.

Pines.--Yellow pine species which include loblolly, longleaf, slash, shortleaf, pitch, Virginia, Table-Mt., sand, and spruce pine.

Other softwoods.--White pine, hemlock, cypress, eastern redcedar, white-cedar, spruce, and fir.

Stand-size class.--A classification of forest land based on the size class of growing-stock trees on the area.

Sawtimber stands.--Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.--Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.--Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and/or seedlings.

State, county, and municipal lands.--Lands owned by States, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Stocking.--The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand and spacing in the stand, compared to a minimum standard of 75 square feet of basal area per acre to fully utilize the growth potential of the land.

Timber removals.--The net volume of growing-stock trees removed from the inventory by harvesting; cultural operations, such as stand improvement; land clearing, or changes in land use.

Unproductive forest land.--Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

Upper-stem portion.--That part of the bole of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Urban and other areas.--Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

Water.

Bureau of the Census.--Streams, sloughs, estuaries, and canals more than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds more than 40 acres in area.

Forest Survey.--The same as Census except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

Conversion factors:

Cubic feet of wood per average cord (excluding bark)

D.b.h. class	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
6	60.5	61.0	69.0	59.8	59.5
8	68.3	67.9	76.3	68.2	68.1
10	73.4	73.0	81.3	73.2	73.2
12	76.9	76.5	85.2	76.3	76.3
14	79.3	79.3	88.0	78.3	78.3
16	81.0	81.5	90.4	79.7	79.7
18	82.1	83.2	92.2	80.7	80.7
20	82.9	84.7	93.7	81.5	81.5
22	83.9	86.6	96.2	82.4	82.6
24+	85.9	89.8	101.8	83.7	83.8
Average	75.4	74.5	86.5	75.1	75.1

COUNTY TABLES

The county tables are intended for use in compiling forest resource estimates for groups of counties. Because the sampling procedure used by the Forest Survey in the Southern Coastal Plain of South Carolina was intended primarily to furnish inventory data for the Unit as a whole, individual county estimates have limited and variable accuracy. As county totals are broken down by various subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the tabulation on page 4.

Table 1.--Area, by land class and county, 1968

County	All land[1/]	Forest land				Nonforest land[1/]
		Total	Commercial forest	Unproductive forest	Productive reserved	
	Thousand acres					
Aiken	701.7	512.4	512.1	--	0.3	189.3
Allendale	267.5	160.6	160.6	--	--	106.9
Bamberg	252.8	152.5	152.1	--	0.4	100.3
Barnwell	350.9	243.2	240.7	2.2	0.3	107.7
Beaufort	376.3	157.0	153.9	--	3.1	219.3
Calhoun	241.3	134.1	134.1	--	--	107.2
Colleton	670.7	484.5	484.5	--	(3/)	186.2
Dorchester	364.1	263.2	262.9	--	0.3	100.9
Hampton	359.7	243.8	243.8	--	--	115.9
Jasper	423.7	312.9	312.9	--	--	110.8
Lexington	453.1	264.6	264.6	--	--	188.5
Orangeburg	707.2	347.8	347.2	--	0.6	359.4
Total	5,169.0	3,276.6	3,269.4	2.2	5.0	1,892.4

1/ From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

2/ Includes 48,600 acres of water according to Survey standards of area classification but defined by the Bureau of the Census as land.

3/ Less than 50 acres.

Table 2.--Area of commercial forest land, by ownership class and county, 1968

County	All ownerships	Ownership class							
		National Forest	Miscellaneous Federal	State	County and municipal	Forest industry	Farmer	Miscellaneous private	
								Corporate	Individual
	Thousand acres								
Aiken	512.1	--	67.8	1.0	0.7	26.6	236.5	34.2	145.3
Allendale	160.6	--	3.9	(1/)	--	47.6	90.1	--	19.0
Bamberg	152.1	--	--	--	(1/)	16.8	110.5	--	24.8
Barnwell	240.7	--	111.6	0.7	(1/)	7.4	72.6	--	48.4
Beaufort	153.9	--	3.1	2.0	0.8	22.5	64.2	--	61.3
Calhoun	134.1	--	--	1.2	(1/)	4.0	103.1	2.9	22.9
Colleton	484.5	--	--	0.7	1.7	89.7	279.0	3.0	110.4
Dorchester	262.9	--	--	1.4	1.2	83.0	133.6	13.7	30.0
Hampton	243.8	--	--	4.5	0.3	60.2	73.8	2.8	102.2
Jasper	312.9	--	--	--	--	63.5	97.0	--	152.4
Lexington	264.6	--	--	0.6	0.3	5.1	178.1	5.8	74.7
Orangeburg	347.2	--	0.6	5.8	(1/)	28.7	247.4	--	64.7
Total	3,269.4	--	187.0	17.9	5.0	455.1	1,685.9	62.4	856.1

1/ Less than 50 acres.

Table 3.--Area of commercial forest land, by forest-type group and county, 1968

County	All type groups	Forest-type groups						
		White pine-hemlock	Longleaf-slash pine	Loblolly-shortleaf pine	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood
	Thousand acres							
Aiken	512.1	--	138.5	104.4	70.1	147.7	48.5	2.9
Allendale	160.6	--	25.3	48.5	34.3	21.3	10.1	21.1
Bamberg	152.1	--	28.6	24.2	30.4	15.9	53.0	--
Barnwell	240.7	--	75.9	38.4	32.5	42.6	51.3	--
Beaufort	153.9	--	15.4	27.0	29.2	42.7	39.6	--
Calhoun	134.1	--	23.7	37.2	11.5	31.5	27.3	2.9
Colleton	484.5	--	72.7	109.4	58.6	66.2	169.5	8.1
Dorchester	262.9	--	32.7	52.8	53.2	13.7	107.8	2.7
Hampton	243.8	--	51.8	52.3	24.7	14.2	100.8	--
Jasper	312.9	--	70.2	46.1	71.0	43.2	50.1	32.3
Lexington	264.6	--	45.0	62.4	40.8	98.0	12.6	5.8
Orangeburg	347.2	--	41.9	58.4	48.5	62.5	135.9	--
Total	3,269.4	--	621.7	661.1	504.8	599.5	806.5	75.8

Table 4.--Area of commercial forest land, by stand-size class and county, 1968

County	All stands	Stand-size class			Nonstocked areas
		Sawtimber	Poletimber	Sapling and seedling	
		Thousand acres			
Aiken	512.1	147.6	111.7	147.4	105.4
Allendale	160.6	66.9	47.5	43.8	2.4
Bamberg	152.1	64.0	29.4	58.7	--
Barnwell	240.7	65.4	78.8	76.5	20.0
Beaufort	153.9	74.0	23.1	45.1	11.7
Calhoun	134.1	66.2	38.4	26.6	2.9
Colleton	484.5	189.3	131.2	157.9	6.1
Dorchester	262.9	155.7	40.5	61.2	5.5
Hampton	243.8	107.3	59.7	68.8	8.0
Jasper	312.9	136.0	68.4	106.9	1.6
Lexington	264.6	102.5	51.7	49.8	60.6
Orangeburg	347.2	167.0	84.0	93.4	2.8
Total	3,269.4	1,341.9	764.4	936.1	227.0

Table 5.--Area of commercial forest land, by site class and county, 1968

County	All classes	Site class				
		1	2	3	4	5
	Thousand acres					
Aiken	512.1	--	2.8	27.2	218.5	263.6
Allendale	160.6	--	--	20.1	131.3	9.2
Bamberg	152.1	--	--	16.6	98.2	37.3
Barnwell	240.7	--	--	16.9	169.7	54.1
Beaufort	153.9	--	--	31.1	106.6	16.2
Calhoun	134.1	--	11.5	43.3	59.2	20.1
Colleton	484.5	--	27.4	116.0	314.8	26.3
Dorchester	262.9	8.3	19.1	86.1	119.4	30.0
Hampton	243.8	2.2	--	27.7	176.5	37.4
Jasper	312.9	--	1.6	66.6	204.4	40.3
Lexington	264.6	--	2.9	4.0	142.5	115.2
Orangeburg	347.2	--	17.5	81.2	214.8	33.7
Total	3,269.4	10.5	82.8	536.8	1,955.9	683.4

Table 6.--Area of commercial forest land, by stocking classes of growing-stock trees, by county, 1968

County	All classes	Stocking percentage[1/]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
Aiken	512.1	--	31.0	178.2	197.5	105.4
Allendale	160.6	2.7	23.3	93.4	38.8	2.4
Bamberg	152.1	--	15.0	104.6	32.5	--
Barnwell	240.7	3.0	16.6	120.5	80.6	20.0
Beaufort	153.9	--	6.7	63.3	72.2	11.7
Calhoun	134.1	--	17.2	74.7	39.3	2.9
Colleton	484.5	8.1	109.3	286.7	74.3	6.1
Dorchester	262.9	--	26.4	165.5	65.5	5.5
Hampton	243.8	2.6	43.8	141.8	47.6	8.0
Jasper	312.9	1.6	37.7	216.3	55.7	1.6
Lexington	264.6	--	18.6	83.0	102.4	60.6
Orangeburg	347.2	--	51.9	162.2	130.3	2.8
Total	3,269.4	18.0	397.5	1,690.2	936.7	227.0

1/ Stocking percentage is based on a standard of 75 square feet per acre.

Table 7.--Volume of sawtimber and growing stock on commercial forest land, by species group and county, 1968

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet[1]				
Aiken	919.5	521.2	17.7	282.3	98.3	313.4	174.3	5.0	93.5	40.6
Allendale	452.6	202.8	29.3	119.8	100.7	153.4	64.0	10.9	43.5	35.0
Bamberg	446.4	136.9	68.9	172.5	68.1	149.5	43.7	23.8	56.9	25.1
Barnwell	408.2	197.7	24.3	125.1	61.1	169.0	69.7	10.1	61.2	28.0
Beaufort	544.1	272.6	3.9	169.1	98.5	167.6	76.6	0.9	52.6	37.5
Calhoun	500.7	259.9	6.7	181.1	53.0	162.3	77.6	1.8	62.0	20.9
Colleton	1,644.9	746.2	83.9	451.1	363.7	577.9	228.6	23.8	192.4	133.1
Dorchester	1,054.9	463.7	147.9	237.2	206.1	343.5	132.3	40.2	99.2	71.8
Hampton	1,025.3	281.4	105.6	330.6	307.7	345.0	94.7	29.1	123.0	98.2
Jasper	978.0	408.1	75.3	240.5	254.1	340.4	120.2	23.8	98.3	98.1
Lexington	486.8	374.1	1.9	58.7	52.1	161.2	112.6	0.7	24.4	23.5
Orangeburg	1,127.7	415.5	109.5	383.7	219.0	398.5	122.9	32.9	157.2	85.5
Total	9,589.1	4,280.1	674.9	2,751.7	1,882.4	3,281.7	1,317.2	203.0	1,064.2	697.3

1/ Factors for converting to cords are shown on page 11.

Table 8.--Net annual growth of sawtimber and growing stock on commercial forest land, by species group and county, 1967

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Aiken	67.4	51.1	0.4	10.2	5.7	18.8	14.4	0.1	2.6	1.7
Allendale	25.7	16.1	0.6	4.8	4.2	8.2	5.2	0.2	1.4	1.4
Bamberg	21.4	9.4	1.9	6.8	3.3	7.3	4.2	0.5	1.6	1.0
Barnwell	33.3	22.3	0.6	6.5	3.9	10.7	6.8	0.2	2.3	1.4
Beaufort	27.5	19.2	0.1	4.2	4.0	7.4	4.7	(1/)	1.4	1.3
Calhoun	33.2	23.6	0.1	7.6	1.9	8.2	5.3	(1/)	2.1	0.8
Colleton	96.0	58.5	2.4	17.7	17.4	28.4	16.5	0.5	5.9	5.5
Dorchester	51.3	31.0	3.4	8.7	8.2	13.7	7.5	0.7	2.8	2.7
Hampton	57.5	26.6	3.4	14.4	13.1	16.1	8.0	0.6	3.7	3.8
Jasper	54.6	29.1	2.3	9.2	14.0	16.7	8.2	0.5	4.0	4.0
Lexington	35.2	29.5	0.1	3.1	2.5	10.3	8.1	(1/)	1.1	1.1
Orangeburg	56.7	27.3	2.9	16.3	10.2	17.6	8.5	0.6	4.6	3.9
Total	559.8	343.7	18.2	109.5	88.4	163.4	97.4	3.9	33.5	28.6

1/ Negligible.

Table 9.--Annual removals of sawtimber and growing stock on commercial forest land, by species group and county, 1967

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Aiken	27.0	22.5	1.6	2.3	0.6	7.8	6.8	0.3	0.6	0.1
Allendale	21.9	10.9	--	6.0	5.0	5.9	2.6	--	1.7	1.6
Bamberg	6.2	3.4	--	1.4	1.4	1.7	0.9	(1/)	0.4	0.4
Barnwell	18.3	6.4	0.9	7.0	4.0	5.1	1.6	0.3	2.2	1.0
Beaufort	16.9	12.2	--	3.8	0.9	5.8	3.8	--	1.3	0.7
Calhoun	21.0	13.7	0.7	5.6	1.0	6.0	4.1	0.2	1.4	0.3
Colleton	124.2	85.6	1.3	25.8	11.5	33.2	21.4	0.3	7.5	4.0
Dorchester	43.2	22.4	1.7	10.1	9.0	11.8	6.0	0.4	2.8	2.6
Hampton	29.1	17.9	1.4	7.9	1.9	8.0	4.7	0.4	2.1	0.8
Jasper	28.3	16.8	1.3	4.6	5.6	7.6	4.8	0.3	1.1	1.4
Lexington	22.4	14.7	--	7.7	--	6.7	4.0	--	2.5	0.2
Orangeburg	44.0	23.4	2.5	9.8	8.3	12.6	5.5	0.8	3.5	2.8
Total	402.5	249.9	11.4	92.0	49.2	112.2	66.2	3.0	27.1	15.9

1/ Negligible.

Table 10.--Area of commercial forest land, by forest type and ownership class, 1968

Forest type	All ownerships	Ownership class				
		National Forest	Other public	Forest industry	Farmer	Misc. private
	Thousand acres					
Softwood types:						
White pine-hemlock	--	--	--	--	--	--
Longleaf pine	258.1	--	31.3	11.7	122.6	92.5
Slash pine	363.6	--	33.3	104.3	136.1	89.9
Loblolly pine 1/	518.3	--	31.6	65.0	286.0	135.7
Shortleaf pine	19.5	--	2.7	--	8.1	8.7
Virginia pine	--	--	--	--	--	--
Redcedar	--	--	--	--	--	--
Pond pine	123.3	--	6.5	19.3	50.9	46.6
Pitch pine	--	--	--	--	--	--
Total	1,282.8	--	105.4	200.3	603.7	373.4
Hardwood types:						
Oak-pine	504.8	--	30.4	53.5	289.5	131.4
Oak-hickory	350.6	--	19.4	21.8	206.1	103.3
Southern scrub oak	248.9	--	14.8	2.1	134.6	97.4
Oak-gum-cypress	806.5	--	33.0	170.1	411.9	191.5
Elm-ash-cottonwood	75.8	--	6.9	7.3	40.1	21.5
Total	1,986.6	--	104.5	254.8	1,082.2	545.1
All types	3,269.4	--	209.9	455.1	1,685.9	918.5

1/ Includes 2,000 acres of spruce pine type.

Table 11.--Area of commercial forest land, by ownership and stocking classes of growing-stock trees, 1968

Ownership classes	All classes	Stocking percentage 1/				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
National Forest	--	--	--	--	--	--
Other public	209.9	--	26.3	118.8	52.9	11.9
Forest industry	455.1	8.8	104.8	246.1	86.4	9.0
Farmer	1,685.9	6.1	167.4	845.1	556.1	111.2
Misc. private	918.5	3.1	99.0	480.2	241.3	94.9
All ownerships	3,269.4	18.0	397.5	1,690.2	936.7	227.0

1/ Stocking percentage is based on a standard of 75 square feet per acre.

Table 12.--Volume of timber on commercial forest land, by class and species group, 1968

Class of timber	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	- - - - - - Million cubic feet - - - - - -				
Sawtimber trees:					
Saw-log portion	2,193.4	951.6	162.7	639.6	439.5
Upper-stem portion	214.5	50.6	16.4	98.3	49.2
Total	2,407.9	1,002.2	179.1	737.9	488.7
Poletimber trees	873.8	315.0	23.9	326.3	208.6
All growing-stock trees	3,281.7	1,317.2	203.0	1,064.2	697.3
Rough trees:					
Sawtimber-size trees	173.6	8.4	2.4	85.4	77.4
Poletimber-size trees	262.2	26.1	2.7	136.0	97.4
Total	435.8	34.5	5.1	221.4	174.8
Rotten trees:					
Sawtimber-size trees	149.0	0.5	7.6	90.0	50.9
Poletimber-size trees	17.4	0.5	0.1	12.8	4.0
Total	166.4	1.0	7.7	102.8	54.9
Salvable dead trees:					
Sawtimber-size trees	3.9	0.7	0.9	--	2.3
Poletimber-size trees	5.0	2.4	--	1.9	0.7
Total	8.9	3.1	0.9	1.9	3.0
Total, all timber	3,892.8	1,355.8	216.7	1,390.3	930.0

Table 13.--Number of growing-stock trees on commercial forest land, by species and diameter class, 19[illegible]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees										
Softwood:											
Longleaf pine	28,570	10,385	6,941	5,099	3,585	1,647	855	219	40	19	--
Slash pine	35,810	24,576	6,880	2,480	880	585	303	5[illegible]	40	16	--
Shortleaf pine	5,020	2,220	1,[illegible]08	694	521	277	72	--	5	3	--
Loblolly pine	64,423	28,515	14,549	8,016	5,274	3,552	2,099	1,223	645	535	15
Virginia pine	--	--	--	--	--	--	--	--	--	--	--
Pond pine	13,077	4,330	2,996	2,542	1,892	638	334	199	75	[illegible]	--
Spruce pine	1,734	647	387	182	155	135	57	73	40	28	--
Cypress	10,964	3,150	2,350	1,578	1,656	1,103	584	312	116	100	15
Other eastern softwoods	86	--	28	43	15	--	--	--	--	--	--
Total softwoods	159,684	73,803	35,161	20,834	14,[illegible]06	7,937	4,104	2,[illegible]76	961	77[illegible]	30
Hardwood:											
Select white oaks[1/]	4,495	1,785	99[illegible]	509	441	256	237	81	82	10[illegible]	9
Select red oaks[2/]	1,481	448	322	152	144	197	88	54	24	42	10
Other white oaks	3,587	1,120	931	508	369	210	156	91	77	[illegible]7	18
Other red oaks	30,431	13,062	6,500	4,593	2,228	1,643	826	716	338	490	35
Hickory	4,681	1,951	944	493	461	388	176	124	65	58	21
Hard maple	8	--	--	--	--	8	--	--	--	--	--
Soft maple	8,338	3,600	1,900	1,064	775	488	237	136	57	81	--
Beech	6	--	--	--	--	--	--	--	--	6	--
Sweetgum	28,229	12,561	6,109	3,514	2,557	1,655	847	543	265	164	14
Tupelo and blackgum	30,718	7,861	6,810	6,209	4,097	2,599	1,747	748	362	277	8
Ash	5,395	2,004	1,090	961	445	446	239	128	14	62	6
Cottonwood	297	103	57	99	--	10	9	5	5	9	--
Basswood	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	4,357	1,419	1,035	727	498	205	183	113	79	89	9
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	366	213	91	55	--	--	7	--	--	--	--
Elm	3,180	57[illegible]	1,156	580	355	184	155	97	34	41	--
Sycamore	213	7[illegible]	26	--	53	--	22	22	4	7	3
Birch (except yellow)	429	40	174	89	82	29	9	6	--	--	--
Other eastern hardwoods	2,951	1,358	482	495	162	211	85	69	35	48	6
Total hardwoods	129,162	48,179	28,619	20,048	12,667	8,529	5,[illegible]23	2,933	1,441	1,584	132
All species	288,846	121,982	63,780	40,882	26,675	16,466	9,127	5,009	2,402	2,354	169

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark and Shumard oaks.

Table 14.--Volume of all live trees on commercial forest land, by species and diameter class, 1968

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Loblolly pine	278.7	24.5	41.0	59.3	67.3	46.4	24.9	11.2	2.7	1.4	--
Slash pine	176.3	49.5	37.5	31.0	19.2	19.6	12.9	2.4	2.8	1.4	--
Shortleaf pine	45.8	5.3	6.6	10.1	9.8	9.5	3.8	--	0.4	0.3	--
Loblolly pine	691.3	61.6	83.4	88.4	96.6	105.2	84.6	66.0	46.1	56.0	3.4
Virginia pine	--	--	--	--	--	--	--	--	--	--	--
Pond pine	134.8	11.7	16.6	26.3	31.8	17.4	10.9	9.3	5.1	5.7	--
Spruce pine	25.8	1.3	2.6	2.2	3.6	3.5	2.4	4.4	2.9	2.9	--
Cypress	214.8	9.9	16.6	23.7	41.1	38.3	31.0	20.3	9.9	16.0	6.0
Other eastern softwoods	1.0	0.1	0.1	0.6	0.2	--	--	--	--	--	--
Total softwoods	1,568.5	163.9	204.4	241.6	269.6	239.9	170.5	113.6	69.9	83.7	11.4
Hardwood:											
Select white oaks[1/]	70.1	4.3	7.4	6.5	9.2	7.4	9.5	5.0	5.4	12.9	2.5
Select red oaks[2/]	32.9	1.4	2.2	2.1	3.2	6.3	3.8	3.1	2.0	6.1	2.7
Other white oaks	96.9	5.1	7.6	8.8	8.8	9.7	9.3	8.9	11.2	19.6	7.9
Other red oaks	477.3	41.3	51.0	65.7	55.4	57.8	40.1	45.2	29.4	74.5	16.9
Hickory	77.8	6.1	7.3	7.6	13.0	13.0	7.9	7.9	5.5	7.6	5.2
Hard maple	0.2	--	--	--	--	0.2	--	--	--	--	--
Soft maple	174.3	19.6	23.9	23.6	24.5	26.6	18.1	15.2	7.9	13.3	1.6
Beech	5.0	--	0.3	--	0.8	0.2	--	--	0.9	2.6	0.2
Sweetgum	389.8	36.2	50.4	52.2	60.9	60.0	42.5	35.4	22.3	25.0	4.9
Tupelo and blackgum	622.7	31.9	65.4	105.2	111.0	97.2	85.9	49.1	31.3	42.1	3.6
Ash	98.6	9.0	11.4	16.4	12.7	16.2	12.9	9.1	1.7	7.6	1.6
Cottonwood	6.5	0.4	0.9	1.3	--	1.1	0.3	0.3	0.8	1.4	--
Basswood	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	76.9	4.1	8.0	9.7	11.4	6.7	8.7	7.4	5.6	11.3	4.0
Black walnut	0.3	0.1	--	--	--	--	--	0.2	--	--	--
Black cherry	6.2	2.0	1.5	1.2	0.5	0.5	0.5	--	--	--	--
Elm	60.7	2.8	8.4	9.8	8.7	6.6	7.4	6.8	2.8	6.2	1.2
Sycamore	6.5	0.3	0.2	0.2	1.5	--	0.9	1.2	0.4	1.1	0.7
Birch (except yellow)	6.7	0.5	1.5	0.9	2.3	0.8	0.3	0.4	--	--	--
Other eastern hardwoods	106.0	24.1	19.0	18.6	7.8	9.7	6.3	6.7	3.3	8.1	2.4
Total hardwoods	2,315.4	189.2	266.1	329.8	328.7	320.0	254.4	201.9	130.5	239.4	55.4
All species	3,883.9	353.1	470.5	571.4	598.3	559.9	424.9	315.5	200.4	323.1	66.8

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark and Shumard oaks.

Table 15.--Volume of growing stock on commercial forest land, by species and diameter class, 1968

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	276.6	23.5	40.4	59.2	66.9	46.4	24.9	11.2	2.7	1.4	--
Slash pine	170.1	45.2	35.9	31.0	19.2	19.3	12.9	2.4	2.8	1.4	--
Shortleaf pine	44.6	5.0	5.7	10.1	9.8	9.5	3.8	--	0.4	0.3	--
Loblolly pine	672.1	55.7	76.1	84.9	95.6	103.7	84.6	66.0	46.1	56.0	3.4
Virginia pine	--	--	--	--	--	--	--	--	--	--	--
Pond pine	128.6	9.5	14.5	25.1	31.4	17.1	10.9	9.3	5.1	5.7	--
Spruce pine	25.2	1.2	2.3	2.1	3.5	3.5	2.4	4.4	2.9	2.9	--
Cypress	202.2	8.1	15.7	21.7	39.6	38.2	30.1	20.3	9.3	12.9	6.3
Other eastern softwoods	0.8	--	0.1	0.5	0.2	--	--	--	--	--	--
Total softwoods	1,520.2	148.2	190.7	234.6	266.2	237.7	169.6	113.6	69.3	80.6	9.7
Hardwood:											
Select white oaks[1/]	64.7	3.8	6.1	5.7	8.0	6.9	9.3	4.4	5.5	12.4	2.6
Select red oaks[2/]	29.7	1.3	2.2	1.7	2.9	6.2	3.8	3.1	2.0	4.8	1.7
Other white oaks	54.0	1.9	4.5	4.8	5.7	5.7	5.7	4.4	4.9	12.1	4.3
Other red oaks	386.0	31.4	40.0	56.2	45.0	49.9	34.4	39.6	24.9	55.2	9.4
Hickory	65.4	3.9	4.7	5.7	8.6	11.8	7.3	7.0	4.8	6.9	4.7
Hard maple	0.2	--	--	--	--	0.2	--	--	--	--	--
Soft maple	101.5	10.4	13.8	14.4	15.9	16.1	10.6	8.5	4.3	7.5	--
Beech	1.5	--	--	--	--	--	--	--	--	1.5	--
Sweetgum	330.6	27.6	37.0	44.1	55.2	53.1	38.6	32.2	20.7	18.4	3.7
Tupelo and blackgum	469.5	16.1	41.3	75.3	84.0	81.6	71.9	41.1	26.5	30.1	1.6
Ash	79.9	5.6	8.6	13.3	10.5	14.8	10.6	7.5	1.1	6.7	1.2
Cottonwood	5.1	0.4	0.6	1.3	--	0.5	0.3	0.3	0.5	1.2	--
Basswood	--	--	--	--	--	--	--	--	--	--	--
Yellow-poplar	70.6	3.5	6.3	9.5	11.0	6.4	8.2	6.7	5.6	10.6	2.8
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	2.5	0.8	0.5	0.7	--	--	0.5	--	--	--	--
Elm	49.1	1.1	6.6	7.2	7.5	5.9	6.8	6.5	2.7	4.8	--
Sycamore	5.9	0.1	0.2	--	1.6	--	1.0	1.2	0.3	0.8	0.7
Birch (except yellow)	5.5	0.2	1.3	1.0	1.5	0.8	0.3	0.4	--	--	--
Other eastern hardwoods	39.8	3.2	2.6	6.4	3.3	6.0	4.1	4.3	2.6	5.9	1.4
Total hardwoods	1,761.5	111.3	176.3	247.3	260.7	265.9	213.4	167.2	106.4	178.9	34.1
All species	3,281.7	259.5	367.0	481.9	526.9	503.6	383.0	280.8	175.7	259.5	43.8

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark and Shumard oaks.

Table 16.--Volume of sawtimber on commercial forest land, by species and diameter class, 1968

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	940.6	233.7	297.7	217.2	119.1	54.8	12.5	5.6	--
Slash pine	337.7	103.1	74.9	79.2	53.4	9.9	11.6	5.6	--
Shortleaf pine	142.0	38.6	40.0	43.4	17.2	--	1.7	1.1	--
Loblolly pine	2,338.3	308.9	390.6	451.0	384.0	306.9	215.4	265.7	15.8
Virginia pine	--	--	--	--	--	--	--	--	--
Pond pine	440.8	92.1	129.3	75.7	50.0	43.8	23.0	26.9	--
Spruce pine	80.7	6.9	12.6	12.0	8.8	17.2	11.1	12.1	--
Cypress	673.0	63.9	134.4	143.9	121.2	86.0	43.3	55.4	24.9
Other eastern softwoods	1.9	1.3	0.6	--	--	--	--	--	--
Total softwoods	4,955.0	848.5	1,080.1	1,022.4	753.7	518.6	318.6	372.4	40.7
Hardwood:									
Select white oaks[1/]	173.8	--	24.4	23.6	33.2	17.0	19.7	47.4	8.5
Select red oaks[2/]	97.3	--	10.5	24.4	15.6	12.5	8.3	19.7	6.3
Other white oaks	153.2	--	17.9	21.6	19.8	16.0	18.5	43.6	15.8
Other red oaks	1,035.9	--	159.3	194.9	142.1	162.8	100.3	235.2	41.3
Hickory	201.7	--	28.8	46.3	27.4	28.4	20.6	30.6	19.6
Hard maple	0.7	--	--	0.7	--	--	--	--	--
Soft maple	207.2	--	44.6	49.5	36.9	31.0	15.8	29.4	--
Beech	7.4	--	--	--	--	--	--	7.4	--
Sweetgum	898.9	--	181.8	214.4	164.9	145.4	95.7	79.7	17.0
Tupelo and blackgum	1,170.1	--	246.4	284.8	254.7	156.0	103.8	118.5	5.9
Ash	182.1	--	29.7	52.9	37.9	26.3	4.6	25.7	5.0
Cottonwood	11.3	--	--	1.8	1.4	1.4	2.5	4.2	--
Basswood	--	--	--	--	--	--	--	--	--
Yellow-poplar	228.8	--	41.2	27.2	37.8	30.8	28.7	49.6	13.5
Black walnut	--	--	--	--	--	--	--	--	--
Black cherry	1.9	--	--	--	1.9	--	--	--	--
Elm	122.5	--	23.7	19.3	25.1	25.2	10.7	18.5	--
Sycamore	22.5	--	4.5	--	3.9	5.2	1.6	4.2	3.1
Birch (except yellow)	8.2	--	3.4	2.0	1.0	1.8	--	--	--
Other eastern hardwoods	110.6	--	9.6	19.7	19.2	17.7	9.3	28.5	6.6
Total hardwoods	4,634.1	--	825.8	983.1	822.8	677.5	440.1	742.2	142.6
All species	9,589.1	848.5	1,905.9	2,005.5	1,576.5	1,196.1	758.7	1,114.6	183.3

1/ Includes white, swamp white, and swamp chestnut oaks.
2/ Includes cherrybark and Shumard oaks.

Table 17.--Net annual growth and removals of growing stock on commercial forest land, by species, 1967

Species	Net annual growth	Annual timber removals
	Million cubic feet	
Softwood:		
Yellow pines	97.4	66.2
Cypress	3.9	3.0
Other eastern softwoods	(1/)	--
Total softwoods	101.3	69.2
Hardwood:		
Select white and red oaks	3.8	2.1
Other white and red oaks	20.0	11.0
Hickory	2.0	1.4
Hard maple	(1/)	--
Sweetgum	12.3	8.2
Ash, walnut, and black cherry	2.6	1.5
Yellow-poplar	4.1	2.4
Other hardwoods	17.3	16.4
Total hardwoods	62.1	43.0
All species	163.4	112.2

1/ Negligible.

Table 18.--Net annual growth and removals of sawtimber on commercial forest land, by species, 1967

Species	Net annual growth	Annual timber removals
	- - - - Million board feet - - - -	
Softwood:		
Yellow pines	343.7	249.9
Cypress	18.1	11.4
Other eastern softwoods	0.1	--
Total softwoods	361.9	261.3
Hardwood:		
Select white and red oaks	12.0	7.2
Other white and red oaks	61.5	34.2
Hickory	6.1	5.3
Hard maple	(1/)	--
Sweetgum	37.6	28.7
Ash, walnut, and black cherry	8.0	2.5
Yellow-poplar	16.4	9.9
Other hardwoods	56.3	53.4
Total hardwoods	197.9	141.2
All species	559.8	402.5

1/ Negligible.

Table 19.--Mortality of growing stock and sawtimber on commercial forest land, by species, 1967

Species	Growing stock	Sawtimber
	Million cubic feet	Million board feet
Softwood:		
Yellow pines	7.4	21.7
Cypress	0.8	1.9
Other eastern softwoods	--	--
Total softwoods	8.2	23.6
Hardwood:		
Select white and red oaks	0.9	3.5
Other white and red oaks	6.3	16.7
Hickory	0.9	3.6
Hard maple	--	--
Sweetgum	2.6	7.6
Ash, walnut, and black cherry	0.5	0.3
Yellow-poplar	0.2	0.4
Other hardwoods	5.1	11.2
Total hardwoods	16.5	43.3
All species	24.7	66.9

Table 20.--Volume of all live trees and growing stock on commercial forest land, by ownership class and species group, 1968

Ownership class	All live trees					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	--	--	--	--	--	--	--	--	--	--
Other public	221.0	84.2	8.4	81.7	46.7	194.6	81.1	7.9	69.1	36.5
Forest industry	827.3	248.4	61.6	309.6	207.7	709.7	242.4	58.7	235.5	173.1
Farmer	1,836.1	660.8	92.2	669.2	413.9	1,545.2	645.9	88.3	512.5	298.5
Miscellaneous private	999.5	359.3	53.6	327.9	258.7	832.2	347.8	48.1	247.1	189.2
All ownerships	3,883.9	1,352.7	215.8	1,388.4	927.0	3,281.7	1,317.2	203.0	1,064.2	697.3

Table 21.--Volume of sawtimber on commercial forest land, by ownership class and species group, 1968

Ownership class	Small sawtimber[1]					Large sawtimber[2]				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	--	--	--	--	--	--	--	--	--	--
Other public	233.7	133.3	9.1	65.7	25.6	274.8	79.7	14.8	111.7	68.6
Forest industry	946.0	451.4	107.6	238.0	149.0	1,133.5	247.8	97.3	425.1	363.3
Farmer	2,264.2	1,280.7	139.7	574.6	269.2	2,207.4	931.7	122.6	673.1	480.0
Miscellaneous private	1,316.0	741.5	87.7	281.9	204.9	1,213.5	414.0	98.1	381.6	321.8
All ownerships	4,759.9	2,606.9	344.1	1,160.2	648.7	4,829.2	1,673.2	332.8	1,591.5	1,233.7

1/ Volume of sawtimber trees less than 15.0 inches at d.b.h.
2/ Volume of sawtimber trees 15.0 inches and larger at d.b.h.

Table 22.--Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group, 1967

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	--	--	--	--	--	--	--	--	--	--
Other public	11.5	7.5	0.1	2.4	1.5	2.2	0.5	--	0.5	1.2
Forest industry	35.8	21.3	1.1	7.0	6.4	26.9	19.0	0.6	3.5	3.8
Farmer	75.4	43.6	1.8	16.6	13.4	61.6	33.1	1.9	19.2	7.4
Miscellaneous private	40.7	25.0	0.9	7.5	7.3	21.5	13.6	0.5	3.9	3.5
All ownerships	163.4	97.4	3.9	33.5	28.6	112.2	66.2	3.0	27.1	15.9

Table 23.--Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group, 1967

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	--	--	--	--	--	--	--	--	--	--
Other public	39.5	26.7	0.5	8.2	4.1	7.4	1.1	--	1.	4.6
Forest industry	115.4	66.6	5.1	21.8	21.9	89.8	64.9	2.3	11.4	11.2
Farmer	262.1	162.6	7.4	55.2	36.9	226.5	134.3	7.3	63.7	21.2
Miscellaneous private	142.8	87.8	5.2	24.3	25.5	78.8	49.6	1.8	15.2	12.2
All ownerships	559.8	343.7	18.2	109.5	88.4	402.5	249.9	11.4	92.0	49.2

Table 24.--Average net volume per acre of sawtimber, growing stock, and other live timber[1/] on commercial forest land, by ownership class, major forest type, and species group, 1968

Forest type, species group, and class of material	Ownership class											
	All ownerships		National Forest		Other public		Forest industry		Farmer		Misc. private	
	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet
Pine types:												
Growing stock:												
Softwood	2,126	706.0	--	--	1,000	521.2	1,812	710.3	2,354	727.4	2,298	722.3
Hardwood	120	57.5	--	--	25	12.0	112	53.6	155	74.0	95	46.4
Total	2,246	763.5	--	--	1,025	533.2	1,924	763.9	2,509	801.4	2,393	768.7
Other timber:												
Softwood	--	22.5	--	--	--	26.9	--	20.8	--	19.2	--	27.7
Hardwood	--	27.8	--	--	--	11.0	--	20.8	--	37.6	--	21.2
Total	--	50.3	--	--	--	37.9	--	41.6	--	56.8	--	48.9
Oak-pine type:												
Growing stock:												
Softwood	1,858	504.0	--	--	2,359	608.6	2,582	705.3	1,826	489.1	1,394	399.1
Hardwood	823	331.2	--	--	521	217.0	2,030	675.4	660	298.6	618	247.5
Total	2,681	835.2	--	--	2,880	825.6	4,612	1,380.7	2,486	787.7	2,012	646.6
Other timber:												
Softwood	--	9.6	--	--	--	5.6	--	3.9	--	9.7	--	13.5
Hardwood	--	110.7	--	--	--	75.4	--	135.9	--	101.2	--	128.9
Total	--	120.3	--	--	--	81.0	--	139.8	--	110.9	--	142.4
Upland hardwood types:												
Growing stock:												
Softwood	494	133.9	--	--	471	116.8	850	216.5	399	115.0	613	157.6
Hardwood	986	414.4	--	--	1,154	485.4	3,463	1,203.4	721	343.6	1,020	397.3
Total	1,480	548.3	--	--	1,625	602.2	4,313	1,419.9	1,120	458.6	1,633	554.9
Other timber:												
Softwood	--	1.3	--	--	--	--	--	4.6	--	1.3	--	1.0
Hardwood	--	168.7	--	--	--	190.1	--	300.6	--	169.1	--	141.7
Total	--	170.0	--	--	--	190.1	--	305.2	--	170.4	--	142.7
Bottomland hardwood types:												
Growing stock:												
Softwood	1,127	315.7	--	--	1,070	296.3	1,354	370.1	1,019	302.7	1,148	293.6
Hardwood	3,964	1,450.0	--	--	5,185	1,994.6	4,508	1,546.6	3,396	1,302.3	4,441	1,573.3
Total	5,091	1,765.7	--	--	6,255	2,290.9	5,862	1,916.7	4,415	1,605.0	5,589	1,866.9
Other timber:												
Softwood	--	15.0	--	--	--	11.9	--	16.4	--	10.5	--	24.3
Hardwood	--	416.7	--	--	--	328.0	--	420.6	--	380.0	--	513.2
Total	--	431.7	--	--	--	339.9	--	437.0	--	390.5	--	537.5
All types:												
Growing stock:												
Softwood	1,521	466.7	--	--	1,129	426.1	1,681	555.8	1,506	447.6	1,545	457.2
Hardwood	1,419	538.6	--	--	1,258	494.3	2,158	745.5	1,224	495.9	1,366	501.1
Total	2,940	1,005.3	--	--	2,387	920.4	3,839	1,301.3	2,730	943.5	2,911	958.3
Other timber:												
Softwood	--	14.7	--	--	--	16.6	--	16.2	--	11.6	--	19.2
Hardwood	--	170.6	--	--	--	109.6	--	198.2	--	167.0	--	175.2
Total	--	185.3	--	--	--	126.2	--	214.4	--	178.6	--	194.4
All timber	2,940	1,190.6	--	--	2,387	1,046.6	3,839	1,515.7	2,730	1,122.1	2,911	1,152.7

1/ Rough and rotten trees.

Table 25.--Land area, by class, major forest type, and survey completion date, 1947, 1958, and 1968

Land use class	Survey completion date			Change 1958-1968
	1947	1958	1968	
	- - - - - Thousand acres - - - - -			
Forest land:				
Commercial forest land:				
Pine and oak-pine types	1,626.8	1,571.7	1,787.6	+215.9
Hardwood types	1,399.5	1,541.2	1,481.8	- 59.4
Total	3,026.3	3,112.9	3,269.4	+156.5
Noncommercial forest land:				
Productive-reserved	5.3	5.6	5.0	- 0.6
Unproductive	0.6	--	2.2	+ 2.2
Total	5.9	5.6	7.2	+ 1.6
Nonforest land:				
Cropland	1,703.2	1,387.7	1,128.4	-259.3
Pasture and range	102.9	164.4	191.3	+ 26.9
Other	321.3	448.6	524.1	+ 75.5
Total	2,127.4	2,000.7	1,843.8	-156.9
All land[1/]	5,159.6	5,119.2	5,120.4	+ 1.2

1/ Excludes all water areas.

Table 26.--Volume[1/] of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date

Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
			SAWTIMBER (in million board feet)								
Softwood	1947	4,295.4	--	--	717.2	798.5	737.1	567.0	519.9	354.7	601.0
	1958	4,003.2	--	--	744.5	840.4	838.3	651.5	442.2	214.2	272.1
	1968	4,955.0	--	--	848.5	1,080.1	1,022.4	753.7	518.6	318.6	413.1
Hardwood	1947	4,455.1	--	--	--	767.8	930.0	719.2	595.1	471.9	971.1
	1958	4,241.0	--	--	--	780.2	927.9	831.1	537.6	434.0	730.2
	1968	4,634.1	--	--	--	825.8	983.1	822.8	677.5	440.1	884.8
			GROWING STOCK (in million cubic feet)								
Softwood	1947	1,244.6	77.7	150.5	198.3	196.8	171.4	127.6	113.8	77.1	131.4
	1958	1,180.2	72.6	150.3	205.8	207.1	194.9	146.6	96.8	46.6	59.5
	1968	1,520.2	148.2	190.7	234.6	266.2	237.7	169.6	113.6	69.3	90.3
Hardwood	1947	1,563.0	72.6	119.7	195.4	242.4	251.5	186.6	146.9	114.1	233.8
	1958	1,596.1	91.7	158.0	220.0	246.4	251.0	215.6	132.7	104.9	175.8
	1968	1,761.5	111.3	176.3	247.3	260.7	265.9	213.4	167.2	106.4	213.0
			ALL LIVE TIMBER (in million cubic feet)								
Softwood	1947	1,281.9	85.6	161.4	204.3	199.3	172.9	128.2	114.0	77.8	138.4
	1958	1,213.6	80.0	161.2	212.1	209.8	196.6	147.3	96.9	47.0	62.7
	1968	1,568.5	163.9	204.4	241.6	269.6	239.9	170.5	113.6	69.9	95.1
Hardwood	1947	2,036.2	123.2	180.7	260.7	305.6	302.8	222.4	177.3	139.9	323.6
	1958	2,089.6	155.7	238.5	293.5	310.5	302.1	257.1	160.2	128.7	243.3
	1968	2,315.4	189.2	266.1	329.8	328.7	320.0	254.4	201.9	130.5	294.8

1/ To provide a basis for valid comparisons, adjustments have been made for differences in volume tables and sawtimber specifications used in previous surveys.

APR 28 1969
TECH. & AGR. DIV.

SOUTH CAROLINA'S TIMBER, 1968

Foreword

This report represents the principal findings of the fourth Forest Survey of South Carolina's timber resource. The survey was started in August 1966 and completed in July 1968. Findings of the three previous surveys, completed in 1936, 1947, and 1958, provide the basis for measuring changes that have occurred and trends that have developed over the past 32 years. However, in this report, the primary emphasis is on the changes and trends that have taken place since the last survey.

More detailed breakdowns of these data, including many county tables, are found in three Survey Unit reports issued as the Survey progressed through the State. Copies of these reports are available from the Southeastern Forest Experiment Station.

The South Carolina Survey is part of the nationwide effort, authorized by Congress in the McSweeney-McNary Forest Research Act of 1928, to maintain a current inventory of the Nation's timber supply. The general objective is to inventory periodically the forest lands, their extent, condition, and volume of timber, and to ascertain rates of forest growth and depletion. The regional experiment stations of the Forest Service, U.S.D.A., conduct periodic surveys to keep the information up to date to provide a sound basis for the formulation of forest policies and programs.

The combined efforts of many people have gone into the Forest Survey in South Carolina. Appreciation is expressed to all Station personnel who participated in the field and office work. The Southeastern Station also wishes to acknowledge the cooperation and assistance of the South Carolina State Commission of Forestry and Clemson University Extension Service, particularly for their survey of timber products output, which provided additional information for this report.

Joe P. McClure, Project Leader of the Forest Survey in the Southeast, planned and coordinated the various phases of the Survey. Noel D. Cost was in charge of data collection. William H. B. Haines was in charge of the computations and also supervised the preparation and interpretation of aerial photographs. Richard L. Welch was responsible for compiling timber removal and mortality information. Herbert A. Knight was in charge of analysis and reporting. John D. Nesbit supervised the collection of all field data, and Thomas R. Bellamy was responsible for the special studies on volume, ownership, and utilization.

The discussion of other recognized forest values in South Carolina—water, fish and wildlife, and recreation—is beyond the scope of this report. The purpose of this publication is to appraise the timber situation.

Walton R. Smith

WALTON R. SMITH, Assistant Director
Watershed, Utilization, Resources,
and Marketing Research

The authors wish to express their thanks to the South Carolina State Commission of Forestry for providing the cover photograph and the illustrations on pages 2, 13, and 18.

U.S.D.A. FOREST SERVICE
RESOURCE BULLETIN SE-13

SOUTH CAROLINA'S TIMBER, 1968

by

HERBERT A. KNIGHT, Associate Resource Analyst

and

JOE P. McCLURE, Principal Resource Analyst

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SOUTHEASTERN FOREST EXPERIMENT STATION
ASHEVILLE, NORTH CAROLINA

1969

Contents

	Page
Highlights	1
Timber trends	3
More commercial forest land	3
New ownership pattern	3
Pine and oak-pine types increase	4
More sapling and seedling stands	4
In general, stands still poorly stocked	4
Inventory volume recovers	5
Growth exceeds removals	6
Timber products output	9
Timber vital to South Carolina's economy	9
Pulpwood surpasses saw logs	9
Lumber production perks up	9
Hardwood veneer log output down	11
Pine plywood plant nears completion	12
Other industrial products	12
Most plant residues used	12
Fuelwood use continues to decline	12
Logging residues and other removals	12
Timber supply outlook	14
Prospective available cut	14
Potential available cut	16
Timber availability	16
Expansion of forest industries	17
Management opportunities	19
Stocking could be greatly improved	19
Part of the idle farmland should be planted with trees	20
Mortality loss could be further reduced	20
Timber utilization could be improved	21
Tree improvement and forest fertilization	21
Cultivate more interest in the production of timber	21
Appendix	24
Survey procedure	24
Accuracy of the survey	24
Definitions of terms	25
Conversion factors	28
Index to detailed tables	29

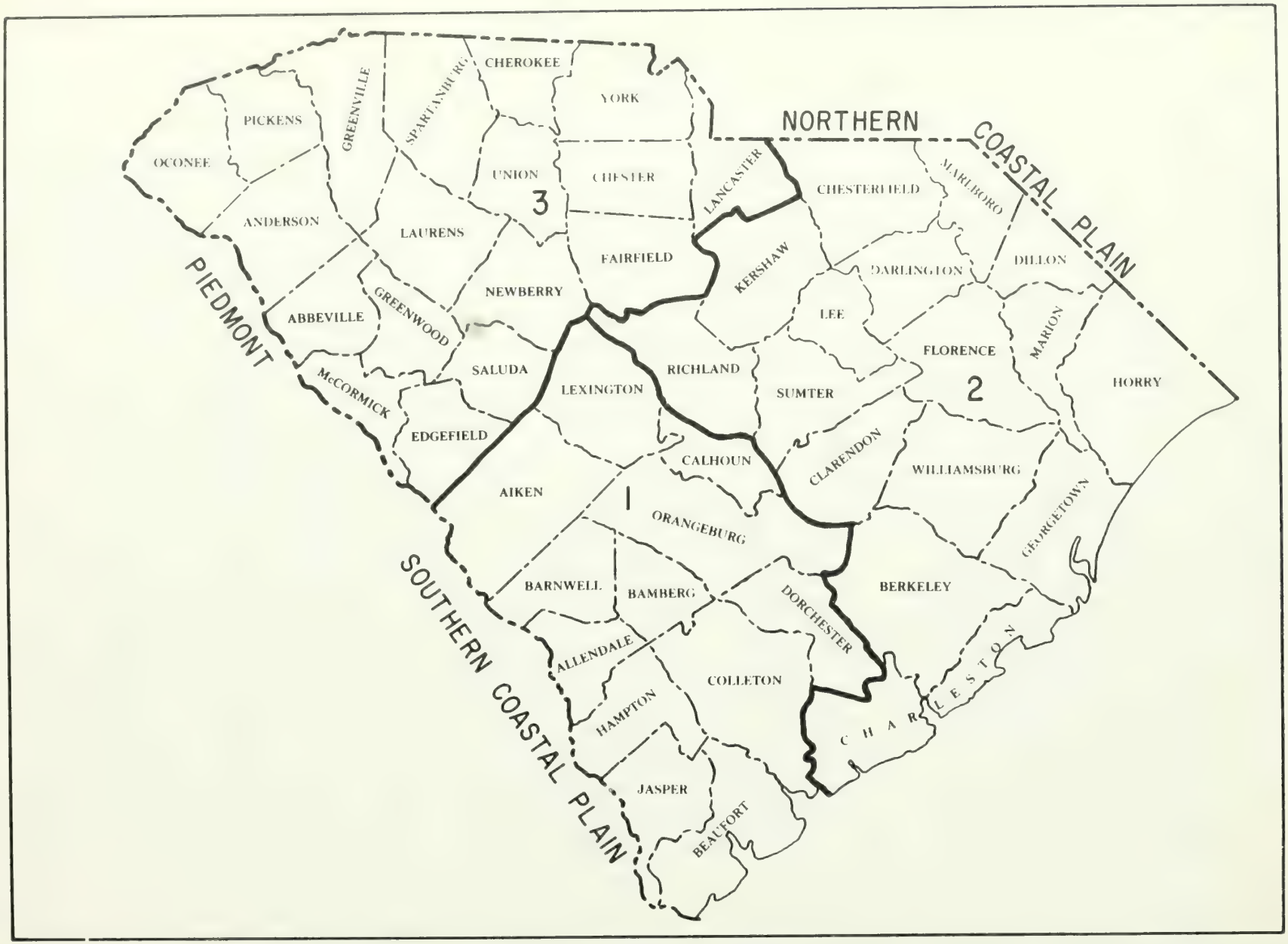


Figure 1.—*Forest Survey Units in South Carolina.*

Highlights

Since the third Forest Survey in South Carolina was completed in 1958—

—area of commercial forest has increased from 11.9 to 12.4 million acres, a gain of 4 percent. Almost two-thirds of this gain occurred in the Piedmont, where the reversion of former agricultural lands to forest is especially noticeable. Most of the remaining increase occurred in the Southern Coastal Plain, where a large share of the tree planting effort in South Carolina has been concentrated. In the Northern Coastal Plain, loss of commercial forest land to other uses just about offset gains.

—area of commercial forest owned by farm operators has decreased from 6.8 to 5.0 million acres, or 27 percent. This decline in farmer-owned forest land was most evident in the Piedmont. Ownership of most of this timberland apparently shifted to the miscellaneous private category, which includes business and professional people, wage earners, housewives, retired people, and other miscellaneous private groups. Collectively, these people now own almost 4.3 million acres of the commercial forest land in the State, and within this group interest in timber growing ranges from none to the most intense. Forest industries have increased their holdings from 1.7 to over 2.0 million acres, mostly in the Northern Coastal Plain. The area of public-owned forest land has remained at about 1.1 million acres.

—area of commercial forest occupied with pine and oak-pine types has increased from 6.7 to over 7.6 million acres, or 14 percent. In contrast, area occupied with hardwood types has been reduced by about 9 percent. These findings indicate a substantial amount of stand conversion and reflect pine planting and management in the State.

—area of commercial forest occupied with sapling and seedling stands has increased from 2.7 to 3.6 million acres, or 33 percent. There has been little change in the total area occupied with poletimber and sawtimber. The area of nonstocked forest land has been reduced by almost one-half. Across the State, about 7 percent of the timber stands originated wholly or in part as the result of artificial regeneration since 1958, and this figure increases to over 10 percent in the Southern Coastal Plain.

—stocking on commercial forest land has increased; however, about one out of every four acres is still poorly stocked with growing-stock trees. Average basal area of all live trees 5.0 inches d.b.h. and larger increased from 50 to 57 square feet per acre. On the average, there are about 65 more sapling-size trees per acre than in 1958. A major obstacle to improved stocking is that rough trees (suitable only for fiber or fuel), rotten trees, and other inhibiting vegetation occupy about one-fourth of the growing space.

—volume of growing stock has increased from 10.3 to about 12.2 billion cubic feet, or 19 percent. This increase, which reverses a downward trend in timber volume between the two previous surveys, is attributed to stepped-up efforts aimed at increasing the timber supply in South Carolina and to a general decline in annual removals up until 1961. Increases in the volume of loblolly and slash pine accounted for almost one-half of the net gain in volume, even though these species make up only 29 percent of the inventory. As a group, the red oaks accounted for 20 percent of the net gain. Less encouraging is the finding that the volume of water tupelo, swamp blackgum, and sweet-

gum increased relatively little. These species are particularly vital to the hardwood veneer industry.

—net annual growth has climbed steadily and now exceeds 650 million cubic feet, or about 53 cubic feet per acre. Impressive and encouraging as these growth statistics are, when compared to past growth rates, net annual growth of timber in South Carolina is still only about two-thirds of the potential if all timberlands were under optimum management. For example, on forest industry, National Forest, and other public forest lands where a large share of the stands are responding to fairly intensive management, net annual growth of growing stock already averages 67 cubic feet per acre. On the farmer and miscellaneous private timberlands, the average is only 48 cubic feet per acre. Of course, some of the difference may be attributed to differences in site or age class distribution among the ownerships.

—annual removals began to increase rapidly after 1961, reversing a downward trend that was particularly evident in the removals of pine. Apparently, during the fifties, a decline in the removals of saw logs, together with the continuing decline in the use of fuelwood, more than offset the increased removals of pulpwood and veneer logs. This slack in wood requirements was temporary, however, and is now being taken up very rapidly. In 1967, net annual growth of growing stock exceeded removals by over 200 million cubic feet, or 48 percent. However, the prospective increase in wood requirements and other removals could consume this surplus by the end of this century, or perhaps sooner. National projections indicate that total supply of all sizes and species will fall below projected removals before 1985.

Timber Trends

MORE COMMERCIAL FOREST LAND

The area of forest land in South Carolina has been on the increase ever since the first Forest Survey back in 1936; today, commercial forests occupy 12.4 million acres or 64 percent of the total land area. Since 1958, about 910,000 acres of commercial forest were added, while 435,000 acres were diverted to other land uses (table I). During this period, almost two-thirds of the net gain occurred in the Piedmont, where the reversion of former agricultural lands to forest is most evident (fig. 1). Most of the remaining gain occurred in the Southern Coastal Plain, where a large share of the tree planting effort has been concentrated.

Although this upward trend in forest area is encouraging to forestry interests and may continue for a short while, increased competition from alternate land uses should not be underestimated over the long run. Food and fiber needs will determine to a large degree the shifts between forest and agricultural use; however, the permanent diversion of forest land from future timber production is a matter of some concern. For example, since 1958, about 185,000 acres of commercial forest land were lost to reservoirs, highways, and urban development. As the population increases, more and more of this permanent diversion of forest land is inevitable. The point is that, in the not-too-distant future, timber requirements will have to be met with a decreasing forest acreage.

NEW OWNERSHIP PATTERN

In earlier Forest Surveys in South Carolina, the private, nonindustrial forest owner was generally a small farmer whose livelihood depended in part upon the sale of timber from his lands. Today, the situation is somewhat different in that the private, nonindustrial forest owner is often a wage earner, doctor, lawyer, or other business or professional person who might not be heavily dependent on his forest land. The implications as to how the trend will affect the timber supply are vague and hard to analyze. Questions like these immediately arise: What are the management intentions of the new owners? Will timber on these lands be available for harvest now and in the years ahead? Will these lands be held for speculation, future development, recreation, or some other purpose—or will they be managed in a positive way to improve their yields of high-quality timber products?

Table I.—*Changes in area of commercial forest land, by Survey Unit, South Carolina, 1958-1968*

Survey Unit	Area of commercial forest land in:		Net change	Changes							
				Total gain	Additions from:		Total loss	Diversions to:			
	1968	1958			Non-forest	Noncommercial forest		Noncommercial forest	Agriculture	Urban and other	Water
	Thousand acres										
Southern Coastal Plain	3,269.4	3,112.9	+156.5	260.7	260.7	...	104.2	1.6	57.0	37.8	7.8
Northern Coastal Plain	4,687.4	4,676.2	+ 11.2	206.3	206.3	...	195.1	12.3	109.9	70.3	2.6
Piedmont	4,453.9	4,145.8	+308.1	443.4	431.5	11.9	135.3	...	68.6	45.8	20.9
State	12,410.7	11,934.9	+475.8	910.4	898.5	11.9	434.6	13.9	235.5	153.9	31.3

Answers to these questions are not found in this report, although many of the data are broken down by ownership. Hopefully, however, the questions themselves will give the reader a better understanding of the importance of ownership patterns to timber supply.

Since 1958, area of commercial forest owned by farm operators decreased from 6.8 to 5.0 million acres, whereas area of commercial forest in the miscellaneous private category increased from 2.4 to almost 4.3 million acres. The shift is most evident in the Piedmont. Over this same period, forest industries increased their commercial forests from 1.7 to 2.0 million acres, and the area of public-owned forest land has remained at about 1.1 million acres.

From these findings, the fact remains that farmers and miscellaneous private groups and individuals still own three-fourths of the commercial forest land in South Carolina. Their forestry attitudes and actions will determine to a large degree the future timber supply.

PINE AND OAK-PINE TYPES INCREASE

Previous Forest Surveys in South Carolina have indicated a downward trend in the area of commercial forest occupied with pine and oak-pine types, with hardwood types on the increase. The new findings show a reversal of these trends, with pine and oak-pine stands up 14 percent and hardwood stands down 9 percent since 1958.

These changes in forest type are attributed to a number of factors: First of all, forestry efforts in South Carolina have been oriented toward growing more pine timber, and the results of these efforts are now appearing in the statistics. Except for fire protection, an equal effort has not been put forth to grow more hardwood. The conversion of scrub oak and other low-quality hardwood stands to pine has become common practice. Another contributing factor has been that pines have seeded in naturally and stocked many acres of idle or abandoned agricultural land. In fact, pines dominate the hardwoods on over 80 percent of all new forest land added since 1958, regardless of origin. Finally, the diversion of commercial forest land to other uses has taken a heavier bite out of the hardwood stands.

Loblolly pine is the leading cover type in South Carolina and occupies over 2.9 million acres. Oak-hickory, with 2.3 million acres, is the second leading type. Close behind is the oak-pine type, which occupies over 2.1 million acres. In this type, southern pine makes up at least 25, but less than 50, percent of the live-tree stocking.[1]

MORE SAPLING AND SEEDLING STANDS

Since 1958, the area of commercial forest occupied by sapling and seedling stands increased from 2.7 to 3.6 million acres, or 33 percent. This increase is attributed to the extensive tree planting programs in South Carolina, as well as to the natural reversion of old fields back to forest. *Tree Planters' Notes*, published by the U.S.D.A., Forest Service, show that about 900,000 acres were planted with trees over this period. The Forest Survey findings show that, across the State, about 850,000 acres of forest land originated wholly, or in part, from artificial regeneration since 1958. Of course, some of the plantings were unsuccessful, and some sapling and seedling stands grew to poletimber or were diverted to other land uses. Altogether, the figures are reasonably consistent for concluding that about one-fourth of the sapling and seedling stands in South Carolina are well-stocked pine plantations established within the past 10 years. With adequate protection and good management, these young stands will make a substantial contribution to the future timber supply.

IN GENERAL, STANDS STILL POORLY STOCKED

Although there has been a measurable build-up in live-tree stocking since 1958, less than 20 percent of the commercial forest land is fully stocked with growing-stock trees, based on a standard that varies by tree size but is set at 75 square feet of basal area per acre for 6-inch trees. This standard is the minimum stocking that will fully utilize the growth potential of the land. By this same standard, about 1 out of every 4 acres is poorly stocked. As might be expected, commercial forest land on the National Forests and forest land owned by forest industry are significantly better stocked, on the average, than forest land owned by farmers and the miscellaneous private

[1] A map detailing the major forest types in the South is available, upon request, from the Southeastern Forest Experiment Station.

group. For example, a third of the National Forest lands and about a fourth of the forest industry lands are fully stocked with growing-stock trees. State forests and some of the other public lands also have a high proportion of fully stocked stands; however, this fact is not evident in some of the tables because of grouping of the data.

It is recognized that, at any given time, a substantial area of the commercial forest under intensive management is in a regeneration stage and shows up as poorly stocked in the Forest Survey. This does not alter the fact, however, that most stands are less than adequately stocked to utilize fully the growth potential. For example, rough trees and rotten trees, together with inhibiting vegetation, occupy 40 percent of the growing space in the poorly stocked stands and 25 percent of the growing space when all stands are included. Even on the poorly stocked stands, only about 22 percent of the growing space is nonstocked; and this average drops to less than 9 percent when all stands are included. The stocking situation, therefore, will not improve in many instances without site preparation or site preparation and planting where there is an inadequate or undesirable seed source.

The stocking problem is greatly magnified if a stricter standard than growing stock is used to define the desirable or crop trees. Only about half of the growing-stock trees have quality characteristics which do not limit their use for the more demanding products. In other words, about half of the growing-stock trees are acceptable but do not qualify as desirable.

INVENTORY VOLUME RECOVERS

Between 1947 and 1958, volume of growing stock declined about 5 percent, causing concern among forestry interests in South Carolina. Perhaps, then, the most significant finding of the new survey is that this downward trend in volume has been reversed (fig. 2). Gains were made in each of the three Survey Units and across all diameter classes. The recovery is attributed to the success of intensified efforts aimed at increasing the timber supply and to a general decline in annual removals up until about 1961.

Since 1958, volume of growing stock increased from 10.3 to about 12.2 billion cubic feet, or 19 percent. Increases in the volume of loblolly and slash pine accounted for almost one-half of the net gain, even though these species make up only 29 percent of the inventory. As a group, the red oaks accounted for another 20 percent of the net gain, although they make up only 12 percent of the inventory. The fact that the most desirable red oaks make up only a small part of this volume removes some of the luster from the increase. Less desirable species, such as laurel, water, and willow oaks, are the primary red oaks in South Carolina in terms of volume.

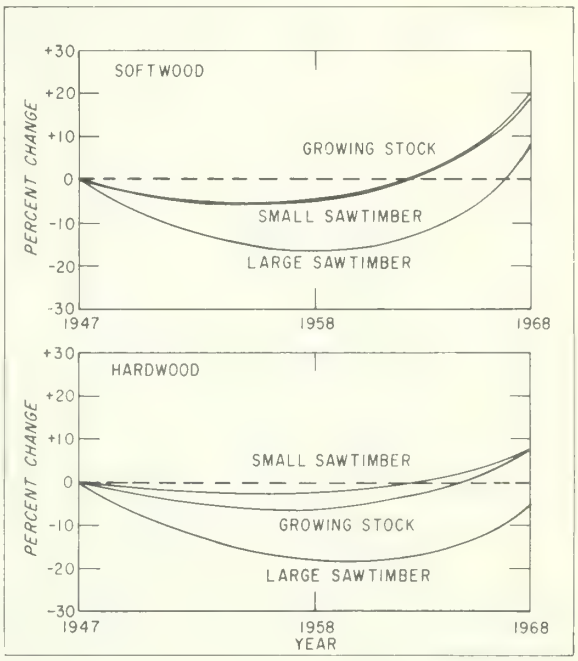


Figure 2. *Percent change in timber volume in South Carolina since 1947.*

One disturbing aspect of the volume trends is that volume of water tupelo, swamp blackgum, sweetgum, and soft-textured hardwoods in general has increased relatively little. These species are vital to some of the hardwood industries, particularly the veneer industry.

Another major species in South Carolina, shortleaf pine, is actually on the decline. This species occurs mainly in the Piedmont, and over the years has been particularly susceptible to littleleaf disease. In managed stands seriously infected with the disease, a common practice has been to remove the shortleaf pine and to convert the stands to some other species of pine.

In this section, the analysis of volume trends has been based on cubic volume of growing stock; however, volume changes in sawtimber since 1958 follow a similar pattern. Currently, almost half of the sawtimber in South Carolina is found in the Northern Coastal Plain (fig. 3).

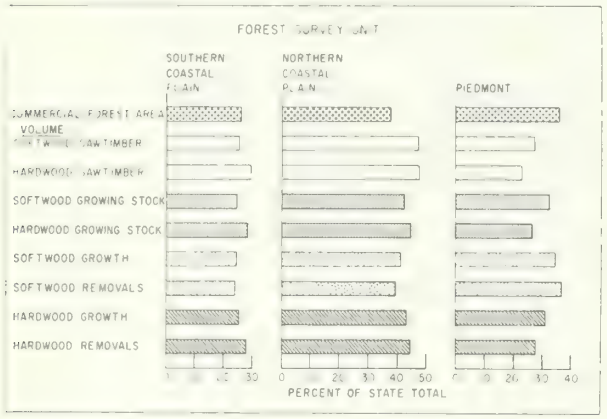


Figure 3. *Relative importance of forest resource by Survey Unit, South Carolina, 1968.*

There, average volume per acre exceeds 3,500 board feet, well above the average in the other two Survey Units.

In the past, questions have sometimes arisen among the readers of Forest Survey reports concerning the terminology used in the breakdowns and discussion of timber volume. Although the definition of terms in the appendix is intended to answer the questions, perhaps a few statements here will help to clarify some of the most common misinterpretations:

1. Volume of all timber includes the net cubic volume of all live trees 5.0 inches d.b.h. and larger from the 1-foot stump to 4.0 inches d.o.b. (In table 11, the volume of salvable dead trees is added.)
2. Volume of growing stock differs from the above in that rough trees and rotten trees are excluded.
3. Volume of sawtimber is the net board-foot volume in the saw-log portion of all live, softwood growing-stock trees 9.0 inches d.b.h. and larger, and of all live, hardwood growing-stock trees 11.0 inches d.b.h. and larger.

To provide a basis for valid comparisons, we have applied current volume equations and merchantability standards to the stem counts made in the previous surveys. This means that the volumes published previously have been adjusted, and any change in volumes between surveys reflects only the change in number of trees by size.

GROWTH EXCEEDS REMOVALS

Net annual growth has responded to the improvement in stocking and increase in inventory and, in 1967, exceeded removals by over 200 million cubic feet, or 48 percent. This is an improved situation over that in the two previous surveys (fig. 4).

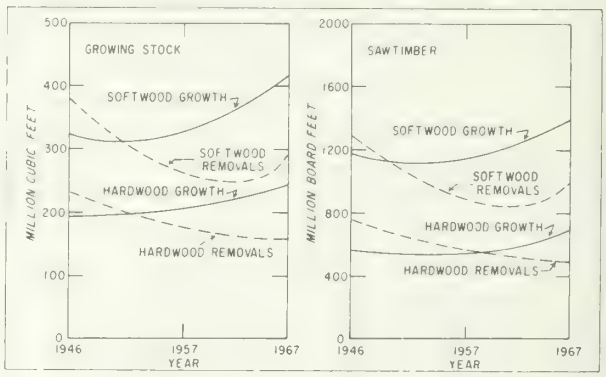


Figure 4. *Trend in net growth and timber removals in South Carolina since 1946.*

The remeasurement of permanent sample plots, established in 1957 and 1958, made possible a more efficient and accurate procedure for determining growth, removals, and mortality. The procedure also provided data for a more detailed breakdown and analysis of these components of change (table II). For example, the findings show that survivor growth accounted for 85 percent of the gross growth in 1967. Survivor growth is the volume increment of growing-stock trees 5.0 inches d.b.h. and larger which were in the inventory at the beginning of the year and were still in the inventory at the end of the year. Ingrowth accounted for about 12 percent of the gross growth, but ranged as high as 16 percent in the Piedmont. Ingrowth is the net volume of growing-stock trees which grew into the 6-inch diameter class during the year. Growth on ingrowth, growth on removals before cutting, and growth on mortality before death made up the remaining 3 percent.

In 1967, mortality of growing stock amounted to 67.5 million cubic feet and reduced the gross

Table II.—*Annual components of change in the volume of growing stock on commercial forest land, by Survey Unit and by softwood and hardwood, South Carolina, 1967*

Survey Unit and species group	Gross growth	Components of growth					Mortality	Net growth	Removals	Net change
		Survivor growth	Ingrowth	Growth on ingrowth	Growth on removals	Growth on mortality				
	Million cubic feet									
Southern Coastal Plain:										
Softwood	109.5	93.2	12.1	2.1	1.9	0.2	8.2	101.3	69.2	+ 32.1
Hardwood	78.6	71.0	6.0	0.7	0.7	0.2	16.5	62.1	43.0	+ 19.1
Total	188.1	164.2	18.1	2.8	2.6	0.4	24.7	163.4	112.2	+ 51.2
Northern Coastal Plain:										
Softwood	181.3	156.6	18.7	2.4	3.3	0.3	11.3	170.0	113.0	+ 57.0
Hardwood	119.9	108.3	9.4	0.9	1.1	0.2	15.3	104.6	68.3	+ 36.3
Total	301.2	264.9	28.1	3.3	4.4	0.5	26.6	274.6	181.3	+ 93.3
Piedmont:										
Softwood	151.3	117.4	28.5	2.5	2.8	0.1	10.2	141.1	105.5	+ 35.6
Hardwood	81.4	70.6	9.1	0.9	0.7	0.1	6.0	75.4	42.7	+ 32.7
Total	232.7	188.0	37.6	3.4	3.5	0.2	16.2	216.5	148.2	+ 68.3
State:										
Softwood	442.1	367.2	59.3	7.0	8.0	0.6	29.7	412.4	287.7	+124.7
Hardwood	279.9	249.9	24.5	2.5	2.5	0.5	37.8	242.1	154.0	+ 88.1
Total	722.0	617.1	83.8	9.5	10.5	1.1	67.5	654.5	441.7	+212.8

growth by about 10 percent. This indicates that mortality has been greatly reduced since 1958; however, it should be remembered that previous estimates of mortality were determined without the benefit of remeasurement plots and therefore were subject to considerable error. Nevertheless, the fact remains that mortality is still taking a substantial toll from the growth each year. Suppression and disease are the leading identifiable causes of death, but pine bark beetles, fire, and weather have also taken their toll. Fire control efforts in South Carolina have been successful; however, fire always poses a serious threat, particularly during extended periods of drought such as those experienced in recent years. A large share of the mortality reported with cause unknown was either directly or indirectly caused by wildfire.

After mortality is deducted, net growth of growing stock amounted to 654.5 million cubic feet in 1967, which averages out at about 53 cubic feet per acre. This means that growth is still well below the potential (75 cubic feet or more) if most forest land were under good timber management. On forest industry, National Forest, and other public forest lands where a large share of the stands are responding to fairly intensive management, net annual growth of growing stock already averages 67 cubic feet per acre. In contrast, on the farmer-owned and miscellaneous private timberlands, the average is only 48 cubic feet per acre. One of the most significant aspects of this finding is that the gap is widening: the gain in average growth per acre on public and industrial lands since the previous survey is double the gain on the private, nonindustrial lands.

Timber Products Output

TIMBER VITAL TO SOUTH CAROLINA'S ECONOMY

The forest products industry is one of the largest and most important industries in the Palmetto State and contributes approximately $600 million to the economy each year. In terms of value added by manufacture, the forest products industry ranks third in the State and is exceeded only by the textile and chemical industries. The primary wood-using industries in South Carolina provide direct employment for about 25,000 persons whose wages and salaries amount to approximately $130 million annually. In 1967, there were about 295 primary wood-using plants operating in the State, with the highest concentration of large plants located in the Northern Coastal Plain (fig. 5).

Output of timber products totaled about 450 million cubic feet in 1967. In terms of volume, this is equivalent to a block of solid wood 1-¾ miles high if stacked between the goal lines and sidelines of a standard-size football field. Pines and other softwoods provided over two-thirds of the total product output.

PULPWOOD SURPASSES SAW LOGS

Since 1950, pulpwood production in South Carolina has increased 2½ times, and in 1967 totaled 216 million cubic feet. This means that the annual output of pulpwood now exceeds the output of saw logs and is the leading timber product in terms of volume. Pines have provided most of the actual increase in pulpwood production; however, the increased use of hardwood for this product is also striking (fig. 6).

Hardwood pulpwood bolts accounted for 20 percent of the total production in 1967, compared to less than 10 percent in 1950. Another relatively recent and important source for both pine and hardwood pulpwood is byproducts from sawmills and other wood-using plants. With the installation of debarkers and chippers, these plants are now able to provide about one-fifth of the pulpwood produced in South Carolina each year. The sale of chips and byproducts to the pulpmills has not only improved timber utilization, but has often meant the difference between profit and loss to sawmill operators.

The 1962 study, "Timber Trends in the United States," projected that the use of pulpwood in the Nation would double by 1995. A more recent study, "Projected Demands for Paper and Board," Forest Resource Report No. 18, December 1967, indicates that the 1962 production will double some 10 years sooner, or by 1985. Although these projections are not necessarily applicable to any particular state, they do suggest that the annual production of pulpwood in South Carolina can be expected to climb to around 350 million cubic feet within the next 20 years.

In 1967, there were five pulpmills in operation in South Carolina. In addition, several pulpmills located outside the State drew wood from South Carolina.

LUMBER PRODUCTION PERKS UP

The lumber industry in South Carolina has changed considerably over the past 25 years as the result of market fluctuations, increased production costs, and competition from other products. Between the peak years of World War II and 1962, annual lumber production declined from 1.1 to less than 0.6 billion board feet, and more than a thousand small, portable sawmills disappeared from the scene. In recent years, however, the decline in lumber production has been reversed, particularly in the case

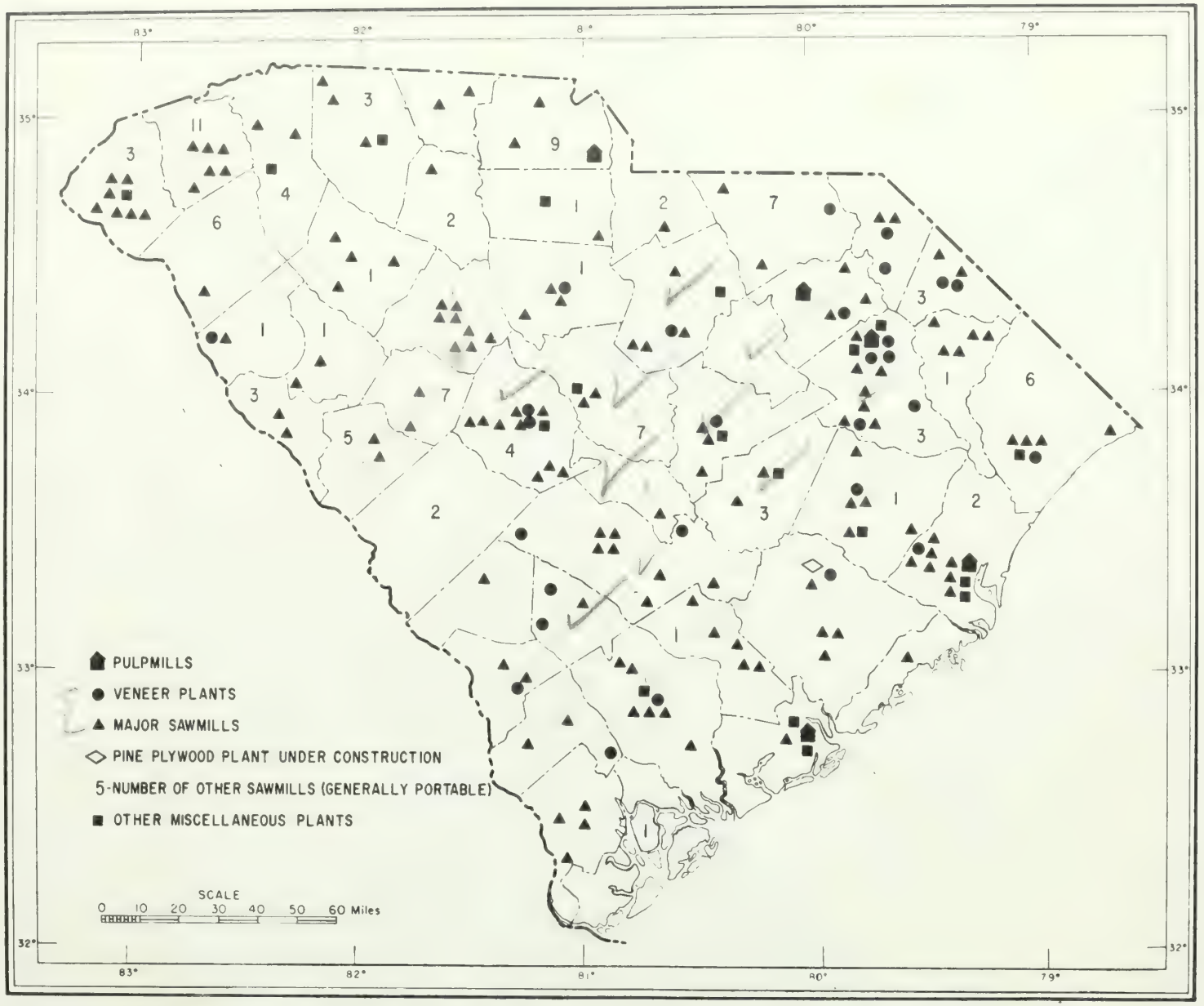


Figure 5. *Location of primary wood-using industries in South Carolina, 1967.*

of softwood (fig. 7). Data on lumber production since 1966 are not yet available from the Bureau of the Census, but from the Forest

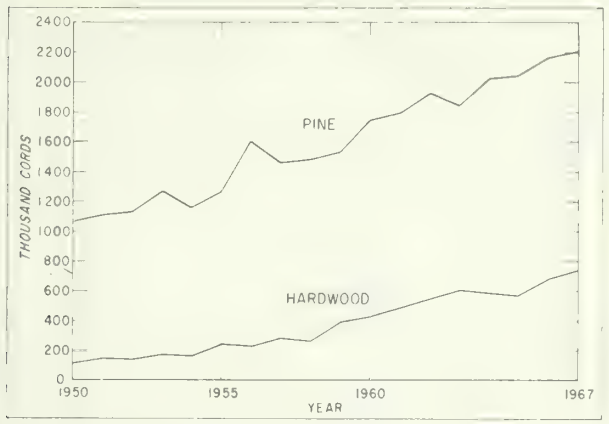


Figure 6. *Pulpwood production in South Carolina, including byproducts, 1950 to 1967.*

Survey findings and the State's timber products output study, saw-log production in 1967 was estimated at over 980 million board feet,

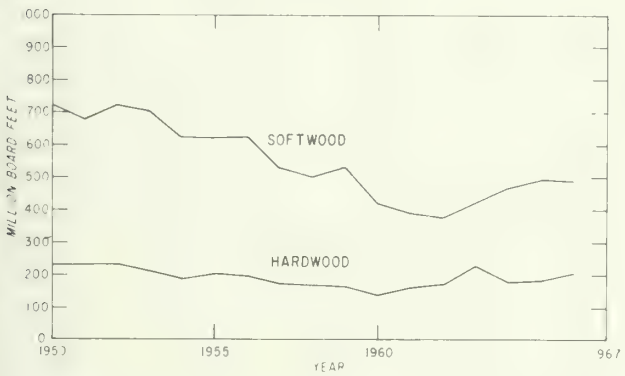


Figure 7. *Lumber production in South Carolina, 1950 to 1967. Source: Bureau of the Census. (Data for 1967 are not available.)*

or about 150 million cubic feet. Softwoods, primarily pines, provided over 70 percent of this total.

The timber products output study showed 254 sawmills operating in South Carolina in 1967. Most are stationary mills, and many have added log debarkers, chippers, and other modern equipment for improving utilization and for more efficient production.

It would be extremely difficult to predict with any reliability the future wood requirements for the lumber industry in South Carolina; however, several important factors have been publicized and merit stating again: Over the next few decades, the Nation is faced with the major task of building new houses for some 100 million people, plus major repair and replacement of older housing. Urban rehabilitation appears likely to require tremendous volumes of building materials. Demands for furniture, other manufactured products, and shipping and handling materials continue to increase. The production of wooden pallets has just about doubled within the past 10 years, and the annual production of crossties has turned upward in recent years after a long decline. The conclusion is that lumber production in South Carolina will very likely continue its recent upward trend.

HARDWOOD VENEER LOG OUTPUT DOWN

Over the years, the bottomland hardwoods in South Carolina have supported an active veneer and plywood industry with water tupelo, swamp blackgum, sweetgum, and yellow-poplar being the key species. The number of veneer plants increased from 25 in 1936 up to about 50 plants during the early fifties, when the annual production of veneer logs exceeded 140 million board feet. The number of plants declined to 28 in 1967 and, in recent years, production seems to have leveled off at around 85 million board feet, or 13 million cubic feet annually. Softwoods accounted for only about 6 percent of the production in 1967.

This industry is quite diversified in South Carolina. Large quantities of veneer are used by the furniture and hardwood plywood manufacturers, as well as by manufacturers of crates and baskets sold to fruit and vegetable shippers. Generally, however, the specifications for hardwood veneer logs are more demanding in terms of tree size and quality than for most other products. For this reason, the timber supply, rather than the markets, has often been the limiting factor in the growth and expansion of this industry. In addition to the problem of procuring an adequate supply of quality timber, the industry has met with increasing competition from foreign imports of hardwood plywood and veneer since the early fifties. Although projected growth in construction, furniture, and other markets suggests substan-

tial increases in the future use of hardwood plywood, imports may supply most of these additional demands.

PINE PLYWOOD PLANT NEARS COMPLETION

South Carolina's first pine plywood plant, now nearing completion in Berkeley County, will employ about 300 people. Based on announced capacity, it will require over 7 million cubic feet of pine veneer logs annually. This plant represents a major expansion in forest industry and will mean a substantial boost in annual timber requirements.

Southern pine plywood is a new forest industry which has moved into the South with almost unprecedented speed. The first such plant was started in Fordyce, Arkansas, in 1963; and over 30 plants are now in operation or under construction in the South. Eventually, this new product is likely to have a significant effect on timber requirements throughout the South.

OTHER INDUSTRIAL PRODUCTS

In addition to the pulpmills, sawmills, and veneer plants, there were some 15 to 20 other primary wood-using plants operating in South Carolina in 1967. Their products ranged from poles, piling, and posts to hardboard and cooperage. Output of all these miscellaneous products totaled about 10 million cubic feet. About 94 percent of this volume came from softwood timber, mainly pine.

MOST PLANT RESIDUES USED

The primary wood-using plants in South Carolina produced an estimated 75 million cubic feet of wood residues in 1967, excluding bark. Over two-thirds of this material was subsequently used in the manufacture of fiber products, specialty items, or for fuel, litter, etc. It is estimated that about 22 million cubic feet were not used for any purpose. Of this amount, about 19 million cubic feet were fine residues, such as sawdust and shavings.

FUELWOOD USE CONTINUES TO DECLINE

Over the past 25 years, annual fuelwood consumption in South Carolina has declined from over 200 million cubic feet to about 60 million cubic feet because of the substitution of oil, gas, coal, and electricity in home cooking, heating, and other uses. This decline in the use of fuelwood released substantial volumes of timber for other products, but will be less of a factor in future changes in wood requirements. Over half of the fuelwood consumed is hardwood.

LOGGING RESIDUES AND OTHER REMOVALS

In 1967, about 17 percent of the merchantable volume of growing stock removed from the inventory was not used for any product. In hardwood removals, this figure ran as high as 30 percent. For all species, the volume of logging residues and other removals was estimated at 76 million cubic feet, with logging residues accounting for over half of this volume. Although it can be assumed that most of the volume left in the woods as logging residue is of poor quality and has limited use, the fact remains that a substantial volume of usable wood fiber is currently being wasted.

Other removals were estimated to total about 32 million cubic feet and include the volume of growing stock removed from the inventory by cultural operations, land clearing, reservoir construction, and urban development. These kinds of removals must be taken into account to comprehend fully the current demands on South Carolina's timber resource.

Timber Supply Outlook

This appraisal of the timber situation in South Carolina would be incomplete if it did not provide a basis for judging whether the timber supply will be adequate to support the wood requirements over the next few decades. Although timber is a renewable resource, forestry is a longterm undertaking, and changes in forestry practices and programs usually do not produce tangible results for many years following implementation. Because of this fact, the current timber situation carries more than the usual implications for future supplies.

The basic indicators outlined in the "Timber Trends" section of this report suggest a rather bright outlook for the timber supply: Volume of growing stock is increasing; net annual growth exceeds removals by a fairly wide margin; and more land seems to be available for timber production, at least temporarily. These should be recognized as general, Statewide conditions, however, which may very well mask deficiencies in certain areas throughout the State. For this reason, the further expansion of forest industry should be orderly and well planned to prevent any over-reaction to the apparent increase in the supply of timber.

PROSPECTIVE AVAILABLE CUT

A projection of the current timber supply in South Carolina to the year 2000 indicates that the prospective available cut of growing stock will increase to about 830 million cubic feet annually. This is almost double the volume of removals in 1967. The projection allows for a further buildup in the inventory from the present 12.2 billion cubic feet to about 15.1 billion cubic feet. Current growth and mortality rates were applied throughout the projection, and this assumes that forest management will be able to counteract any tendency for mortality to increase and radial growth to decrease in response to higher stand densities. The primary control in the projection, however, was an assumption that the current margin between growth and removals will gradually diminish over the next 32 years until growth and removals are in balance by the year 2000.

Separate projections were made for softwoods and hardwoods (fig. 8). As might be

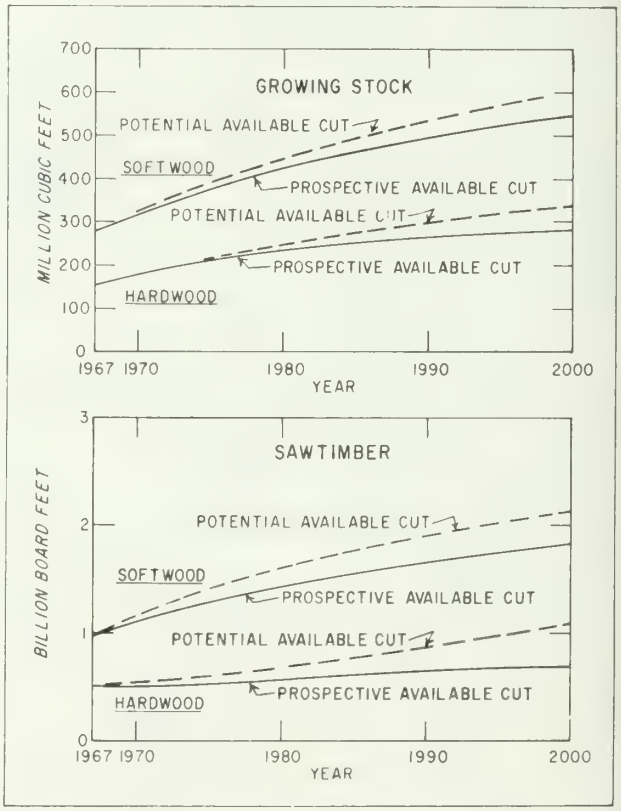


Figure 8. *Prospective and potential available cut, South Carolina, 1967-2000.*

expected, the results show that softwoods will provide about two-thirds of the increase in the prospective available cut of growing stock and over 80 percent of the prospective increase

in available sawtimber. Hardwoods occupy roughly one-half of the growing space in South Carolina's forests and make up about one-half of the total volume of growing stock; yet, in 1967, hardwoods provided only about one-third of the net growth. These findings should not be interpreted to mean that hardwoods on good sites will not produce as much timber as well-managed pine stands on good sites. The findings simply reflect the greater efforts that have been put forth to grow more pine timber compared to the small effort put forth for the hardwoods. For example, *Tree Planters' Notes* show that almost 1.5 million acres have been planted with trees in South Carolina and that practically all of these plantings have been pine (table III). The Forest Survey findings confirm that over 1.1 million acres of the commercial forests now in the State originated wholly or in part from artificial regeneration (table IV). The above statements are not meant to imply that planting is also the answer to hardwoods.

Table III.—*Acres of forest planting,*[1] *by ownership class, South Carolina, 1957-1967*

Fiscal year	Ownership class				All ownerships	Accumulative total
	National Forest	Other public	Forest industry	Other private		
	Acres					
						[2] 396,944
1957	271	12,034	21,086	32,421	65,812	462,756
1958	429	12,598	8,732	55,785	77,544	540,300
1959	790	16,464	28,274	122,723	168,251	708,551
1960	705	11,622	20,427	154,939	187,693	896,244
1961	753	6,211	21,539	133,475	161,978	1,058,222
1962	1,442	9,272	19,063	58,677	88,454	1,146,676
1963	2,667	8,227	15,623	41,683	68,500	1,215,176
1964	2,944	13,334	22,776	34,044	73,098	1,288,274
1965	3,634	14,548	23,265	31,594	73,041	1,361,315
1966	3,402	10,542	26,230	24,970	65,144	1,426,459
1967	4,861	5,898	15,160	33,159	59,078	1,485,537

[1] Includes acres of planting by direct seeding. Source: U. S. Department of Agriculture, Forest Service, *Tree Planters' Notes*, 1957-1967.
[2] Accumulative total prior to FY 1957.

The peak planting years were 1959, 1960, and 1961, when the yearly average exceeded 170,000 acres. With adequate protection and management, all of the pine plantations now established should develop into well-stocked sawtimber stands by the year 2000, if allowed to grow. In the meantime, the stands can be thinned periodically to provide additional timber. Currently, tree planting continues in South Carolina at the rate of about 60,000 acres per year.

Although efforts to improve and perpetuate the supply of hardwood timber have not matched efforts devoted to growing more pine timber, fire protection has contributed to a fairly rapid buildup of young hardwoods. Too many of the hardwoods, however, are on dry, upland sites unsuitable for the best development of quality hardwood sawtimber. Also, many hardwood stands have been left in poor condition for management and without any hope of adequate natural regeneration following logging. As the result of many years of high grading, almost one-fifth of the hardwood growth is being added onto rough trees and rotten trees. Although this growth will add to the supply of wood fiber, it will not contribute directly to any increase in the supply of sawtimber. In the projection, a continuation of this loss of potential growth was assumed.

The projection indicates that there will be only a 40-percent increase in the prospective available cut of hardwood sawtimber by the

Table IV.—*Area of commercial forest land, by stand origin and Survey Unit, South Carolina, 1968*

Stand origin	All Survey Units		Survey Unit					
			Southern Coastal Plain		Northern Coastal Plain		Piedmont	
	M acres	*Percent*	*M acres*	*Percent*	*M acres*	*Percent*	*M acres*	*Percent*
Natural stands with no evidence of artificial regeneration	11,267.5	90.8	2,760.3	84.4	4,359.6	93.0	4,147.6	93.1
Stands originating wholly or in part from artificial regeneration since 1958	852.1	6.9	346.9	10.6	247.0	5.3	258.2	5.8
Stands originating wholly or in part from artificial regeneration prior to 1958	291.1	2.3	162.2	5.0	80.8	1.7	48.1	1.1
All stands	12,410.7	100.0	3,269.4	100.0	4,687.4	100.0	4,453.9	100.0

year 2000. This is the smallest increase predicted in the projection and suggests that the outlook for any substantial increase in the supply of hardwood sawtimber is certainly less optimistic than the outlook for pine sawtimber. This projection supports a growing concern over the possibility that serious deficits may develop in the hardwood timber supply in the last third of this century, unless greater efforts are put forth in the management of the hardwoods.

POTENTIAL AVAILABLE CUT

A second projection was made to obtain estimates of the potential available cut, based on an assumption that both the inventory and growth of timber could be increased over the next 50 years through accelerated timber management of South Carolina's forest land. Results from this projection indicate a potential available cut from growing stock of about 940 million cubic feet by the year 2000. This estimate of potential cut can be compared to the prospective estimate of 830 million cubic feet.

To sustain an annual cut of 940 million cubic feet on 12.4 million acres of commercial forest land would require that net annual growth average about 75 cubic feet per acre. This is not an unrealistic growth rate according to the site data collected in South Carolina, and is perhaps a conservative estimate of potential growth if the gains that could be made through accelerated timber management, including tree improvement and forest fertilization programs, are considered. To achieve this growth rate by the year 2000, however, would certainly call for an intensification of forest management, particularly on the private, nonindustrial forest lands. As mentioned earlier, net annual growth of growing stock now averages less than 55 cubic feet per acre on all ownerships, and less than 50 cubic feet per acre on the private, nonindustrial timberlands.

TIMBER AVAILABILITY

It is unfortunate, yet understandable, that Forest Survey cannot provide a direct measure of the volume of timber available to industry. It must be remembered that the survey is designed to measure the physical attributes of the total timber resource, rather than the owners' attitudes concerning the disposition of their timber. The projections presented in this report provide estimates of total available cut; however, many complex and interacting factors will determine how much of this timber will actually be available to industry at any given time. Of course, one of these factors will be the timber owners' willingness to sell the timber they grow. As the population continues to increase and people have more leisure time, the aesthetic value and recreational uses of the forests will also grow. One likely result of these trends is that more and more owners will tend to withhold their timber from the markets in favor of nontimber uses, unless the concept of multiple use is more widely accepted and practiced.

Some timber is not economically available because of location, low volumes per acre, small size, or undesirable characteristics. Tables 31, 32, and 33 in the appendix are presented to help answer some of the questions concerning availability and operability. For example, only about half of the commercial forest land in South Carolina has 1,500 or more board feet of sawtimber per acre. Some saw-log producers might consider all other areas inoperable because of the low volume per acre. Furthermore, about 30 percent of the forest land with 1,500 or more board feet per acre is found in deep swamps, bays, stream margins, mountains, or other physiographic classes where accessibility and logging conditions might further affect the availability of the timber. With the current trend toward increased mechanization in timber harvesting to offset increasing labor costs, it will likely become more difficult to channel all of the available timber into the supply stream. In other words, it may not be practical or profitable to operate some of the more sophisticated and expensive equipment in scattered stands with low volumes or in some of the more inaccessible areas. Before the end of this century, the forest may be planned to facilitate the harvest rather than the harvest planned to fit the forest. In contrast with this line of thought, however, many timber managers strongly advise management systems that will yield the greatest fiber growth, and depend upon the engineers to develop the necessary harvesting machinery.

Finally, timber quality rather than timber quantity often determines availability, particu-

larly in the case of hardwoods. Although the movement has been toward the production of the greatest quantity of wood fiber over the shortest period of time, there will continue to be a demand for wood with certain characteristics found only in some of the preferred hardwood species. These woods bring premium prices wherever they can be found; however, low prices paid for hardwood stumpage in general contribute to the hardwood availability problem. The statistics clearly explain why some of the hardwood users are experiencing difficulty in procuring an adequate supply of timber from an inventory that totals 8.1 billion cubic feet. First of all, 24 percent, or almost 2.0 billion cubic feet, is in trees that do not qualify as growing stock because of internal rot, roughness, poor form, or species. Most of this material is suitable only for fiber products, fuelwood, or other local consumption. Another 23 percent, or 1.9 billion cubic feet, is in trees too small for sawtimber. When another 6 percent is deducted for volume in the upper-stem portions of sawtimber trees, less than half of the original total remains. This means that the maximum volume of hardwood in the present inventory that can be manufactured into lumber, ties, timbers, and veneer is less than 3.8 billion cubic feet. If the product specifications call for grade 1 and 2 logs, the maximum available volume drops to about 1.5 billion cubic feet. In spite of the high grading that has occurred in the harvesting of so many hardwood stands, the findings indicate some improvement in the quality of hardwood since the previous survey. For example, in 1958, only about 30 percent of the hardwood sawtimber volume met the specifications for log grades 1 and 2, compared to about 40 percent in this latest survey. In conclusion, it may be that technology will minimize the need for top quality timber; however, it seems likely that both intensified forest management to improve timber quality and research to improve wood utilization will be economically desirable in the foreseeable future.

EXPANSION OF FOREST INDUSTRIES

The Forest Survey findings indicate that the timber resource in South Carolina can support further expansion of existing forest industries or the establishment of new forest industries that can use pine and low-quality hardwood in some areas. Careful attention should be given to the county data provided in the three Unit reports before new plant locations are selected. Until more favorable trends develop, a more cautious approach is recommended in any major expansion of forest industry which will require large quantities of quality hardwood. In any eventuality, the momentum generated in improving the timber supply in South Carolina will need to be sustained.

Management Opportunities

In the earlier chapters of this report, the objectives have been to describe trends in the timber supply and timber products output and to evaluate the timber supply outlook in South Carolina. The findings substantiate the improvement made in the timber supply since the previous survey, but also emphasize the fact that there is still a wide gap between the current and potential annual growth of timber. Although the recommendation of specific treatments and programs falls outside the scope of Forest Survey and this report, this chapter will present some of the opportunities for increasing timber production as suggested by the Survey findings.

If the total area of commercial forest land, by forest type, in South Carolina is broken down into proportions occupied by the various tree classes and sizes, a broad picture of needed action unfolds (table V). This analysis shows that desirable trees occupy 35 percent of the growing space; acceptable trees 32 percent; and that the remaining 33 percent is either nonstocked or occupied by rough trees, rotten trees, and inhibiting vegetation. The analysis further shows that desirable sawtimber trees occupy only about 14 percent of the total growing space.

STOCKING COULD BE GREATLY IMPROVED

To achieve potential growth, stands must be adequately stocked with growing-stock trees. The findings show that over one-half of the commercial forest land in South Carolina is fully stocked with live trees, but that only 1 acre in 6 is fully stocked with growing stock.

Table V.—*Commercial forest area by major type of action suggested by current spatial occupancy, by forest type, 1968*

Type of action suggested	Commercial forest area		Current forest type			
			Pine	Oak-pine	Upland hardwood	Bottomland hardwood
	Percent	*Thousand acres*				
No treatment needed:						
Sawtimber	13.6	1,684.0	653.2	290.1	271.7	469.0
Poletimber	7.7	962.3	449.9	161.9	214.0	136.5
Sapling and seedling	13.5	1,672.6	1,013.0	296.8	268.7	94.1
Total	34.8	4,318.9	2,116.1	748.8	754.4	699.6
Stand improvement:						
Sawtimber	15.1	1,876.0	847.0	293.1	301.2	434.7
Poletimber	11.2	1,392.2	788.8	203.6	254.4	145.4
Sapling and seedling	5.6	690.8	398.2	120.3	134.8	37.5
Total	31.9	3,959.0	2,034.0	617.0	690.4	617.6
Regeneration:						
Without site preparation	8.7	1,079.7	561.3	161.7	242.6	114.1
With site preparation	24.6	3,053.1	812.9	597.3	970.0	672.9
Total	33.3	4,132.8	1,374.2	759.0	1,212.6	787.0
Total	100.0	12,410.7	5,524.3	2,124 8	2,657.4	2,104.2

About one-fourth of the growing space is occupied with rough trees, rotten trees, and other inhibiting vegetation, which are producing an estimated 90 million cubic feet of low-grade growth each year. Although this growth produces wood fiber, the material is of limited use and is considered a liability rather than an asset to the future timber supply. Another 8 to 10 percent of the growing space within the commercial forests is nonstocked with trees of any kind, and therefore is contributing no growth whatsoever. Altogether then, about one-third of the growing space, or 4.1 million acres of commercial forest, is either nonstocked or occupied with rough trees, rotten trees, and other inhibiting vegetation. If these 4.1 million acres were fully stocked with desirable trees, they could contribute an additional 300 million cubic feet of growth annually. This will not happen under natural conditions, but will require site preparation and regeneration.

The remaining two-thirds of the growing space, 8.3 million acres, is occupied with growing-stock trees; however, about half of these trees do not qualify as desirable, or crop trees, because of defects and characteristics which limit their present or prospective use for timber products. For this reason, thinning and other stand improvement to favor the better-quality trees and more desirable species could greatly improve the quality and value, and to some extent the quantity, of timber produced.

PART OF THE IDLE FARMLAND SHOULD BE PLANTED WITH TREES

The findings show that there are about 850,000 acres of idle farmland in South Carolina. Some of this land may be returned to crops and improved pasture and some will be used for urban development, but in the past much of this land was allowed to revert to forest. The prompt planting of these idle acres to trees provides a faster and more direct opportunity for increasing the timber supply. If only half of this idle farmland were planted with tree species suitable to the local site conditions over the next few years, it could increase the annual growth of timber by over 30 million cubic feet by the year 2000. The opportunity for increasing forest acreage is most apparent in the Piedmont, where there are over one-half million acres of idle farmland. As the demand grows for nonforest land use, the opportunity for increasing the timber supply by expanding the forest acreage is likely to diminish.

MORTALITY LOSS COULD BE FURTHER REDUCED

In 1967, almost 68 million cubic feet of growing stock was lost to mortality. Although this is less than half the volume of mortality reported in the previous Forest Survey, it still represents a substantial loss of potential timber growth each year—about 10 percent of the gross growth in 1967. Much of the mortality is so widely scattered throughout the stands that very little is salvaged in the course of normal harvest operations. No single primary cause of death stands out above all others, with the possible exception of littleleaf disease on shortleaf pine in the Piedmont. There, on managed stands, losses have been reduced by favoring loblolly pine over shortleaf pine on known littleleaf sites. Generally, fire, insects, disease, suppression, weather, and other natural destructive agents all take a toll; and it is not until the losses are added together that the full impact of mortality is realized.

Because of the excellent fire control in South Carolina over the past decade, timber losses to wildfire have been confined to relatively small areas, with few exceptions (table VI). All forest lands in the State are protected from fire; and the success of the program has reduced, but not eliminated, the risk of widespread loss. Continued cooperation from the general public, particularly during prolonged periods of

Table VI.—*Forest area under fire protection, protected area burned, number of fires, and average size of fires, South Carolina, 1957-1967*[1]

Year	Forest area protected		Protected area burned		Fires	Average size of fires
	Thousand acres	*Percent*	*Thousand acres*	*Percent*	*Number*	*Acres*
1957	11,797	100	39	0.33	3,305	12
1958	11,795	100	28	0.24	3,593	8
1959	11,794	100	31	0.26	3,458	9
1960	11,798	100	45	0.38	4,034	11
1961	11,798	100	57	0.48	4,655	12
1962	11,796	100	45	0.38	3,988	11
1963	11,796	100	77	0.66	5,718	14
1964	12,687	100	29	0.23	2,733	11
1965	12,693	100	41	0.33	3,882	11
1966	12,698	100	138	1.09	4,940	28
1967	12,698	100	83	0.65	5,107	16

[1] Source: U. S. Department of Agriculture, Forest Service, *Forest Fire Statistics, 1957-1967.*

drought, is essential to protect and encourage the efforts required for intensive timber management. In contrast to wildfire, prescribed or controlled burning is a valuable tool in timber protection and management, but it must be applied with caution and skill and only under appropriate conditions.

Some mortality losses are inevitable, and perhaps the greatest opportunities for holding them to a minimum over the long run are to be found in the indirect approaches to the protection problem. In other words, it is probably best to adjust management plans and silvicultural practices to reduce the risks of widespread mortality, rather than to rely so heavily upon the direct control of the damaging agents. For example, in regeneration efforts, it is important that the tree species be properly matched with the site and that, subsequently, proper spacing within the stand be maintained throughout the rotation. Once mortality occurs, however, direct control and salvage operations must be quickly implemented to confine the spread and reduce losses.

TIMBER UTILIZATION COULD BE IMPROVED

Another opportunity for conserving the timber supply is to produce more products from the same amount of timber through improved harvesting practices and manufacturing techniques. Much progress has been made in using plant residues and harvesting more of the timber on logging operations; however, the waste of usable wood fiber is still apparent. For example, in 1967, combined logging and plant residues totaled 66 million cubic feet, and other removals resulted in the loss of another 32 million cubic feet of unused growing stock. If only half of this wood fiber were used for products, the annual output of timber products could be increased by 10 percent without any increase in timber removals.

TREE IMPROVEMENT AND FOREST FERTILIZATION

Beyond the opportunities available for increasing the timber supply in South Carolina through a more intense application of the proved and conventional management, protection, and utilization practices, some of the newer and bolder ideas certainly merit mention in this report. There is a growing interest in the possibilities which improved genetic stock and forest fertilization offer. It is not the intent here to segregate tree improvement and forest fertilization from stand density control and the other aspects of intensive silviculture, but to treat them in proper perspective in terms of the knowledge available.

Tree improvement efforts are not new in forestry, but progress in improving the genetic makeup of trees has been slower than the progress in food and other fiber plants. The wide-scale use of forest fertilization as a practical means of increasing timber yields, however, is relatively new. Neither of the treatments necessarily has to accompany the other, but the objective in their application would generally be the same—to grow more wood on fewer acres and on a shorter rotation.

At the risk of oversimplification, it can be stated that the basic concept in tree improvement is that trees with superior external and internal characteristics can be propagated through the proper choice in seed selection and planting stock. The basic concept in forest fertilization is that on certain sites it is economically feasible to speed up timber growth without sacrificing desirable tree characteristics, through the wide-scale application of fertilizers. It is certainly conceivable that forest geneticists will develop strains of trees with a high response to fertilizers, and whose rapid growth will not be offset by reduced specific gravity or other adverse effects. Forest fertilization might then become almost as common as site preparation and planting.

CULTIVATE MORE INTEREST IN THE PRODUCTION OF TIMBER

In conclusion, perhaps the greatest opportunity for perpetuating and improving the timber supply in South Carolina is to promote more interest among private, nonindustrial forest owners in growing timber. Collectively, these people own three-fourths of the commercial forest land, and their actions and attitudes hold the key to any substantial increase in the timber supply simply because of the large share of productive forest land involved and the economic location of these holdings. Some of these owners, for various reasons, are simply not interested in growing timber for the markets; however, many others are willing to make the

necessary investments for improving the management of their forests. Where such interest and willingness are found, it is important that the owner or forest manager have access to the best professional advice and silvicultural knowledge available so that there can be optimum returns from the investment. Major forestry programs must be flexible enough to encompass both the timber and nontimber interests among the private landowners.

Appendix

SURVEY PROCEDURE

The basic data presented in this report were obtained by a sampling procedure designed for use, with some regional variation, by Forest Survey units throughout the Nation. The method of survey is intended to provide reliable statistics primarily at the State level, and to assure that these statistics have a certain degree of comparability with similar data collected across the Nation. The basic steps of the procedure used in South Carolina were as follows:

1. Initial estimates of forest and nonforest areas were based on the classification of 106,887 sample points systematically spaced on the latest aerial photographs available.

2. The initial estimates of area by land-use class were either verified or adjusted on the basis of a ground check at 6,501 of these sample points.

3. Estimates of timber volume and forest classifications were based on measurements recorded at 4,230 of the ground check locations which fell within commercial forest land. A 10-point cluster of plots systematically spaced on an acre was measured at each of these sample locations using a basal area factor of 37.5 square feet per acre. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

4. Equations prepared from detailed measurements collected on the trees tallied at one out of every 20 sample locations were used to compute the volumes of individual tally trees. A mirror caliper and sectional aluminum poles were used to obtain the additional measurements on standing trees required to construct the volume equations. The same 5-percent subsample of plots used for the tree-volume study also served as a quality control of field measurements. Felled trees were measured at approximately 100 active cutting operations to provide utilization factors for product and species groups and to supplement the standing tree-volume study.

5. Some 3,646 permanent sample plots established in 1956 and 1957 were reconstructed, and their remeasurement provided the primary estimates of growth, removal, and mortality. A 1967 survey of timber products output, conducted by the South Carolina State Commission of Forestry and Clemson University Extension Service foresters, along with the annual pulpwood production study in the South, provided additional information for breakdowns of removals by product.

6. Ownership information was collected from local contacts, correspondence, and public records. In those counties where the sample missed a particular ownership class, temporary sample plots were added and measured to describe the forest conditions within the ownership class.

7. All field data were sent to Asheville for editing and were punched in cards and stored on magnetic tape for computer processing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

ACCURACY OF THE SURVEY

Statistical analysis of the data indicates a sampling error of ±0.5 percent for the estimate of total forest area, 1.5 percent for total cubic volume, and 1.3 percent for total cubic-volume growth. At the State level, the cubic-foot removal estimates are consistent with the growth figures and the changes in inventory over the remeasurement periods. As the totals are broken down by forest type, species, tree diameter, and other subdivisions, the sampling error increases. The order of this increase is suggested in the following tabulation, which shows the sampling error to which the estimates are liable, in terms of one standard error, or two chances out of three.

Forest area	Sampling error [1]	Cubic volume	Sampling error [1]	Net cu.-ft. growth	Sampling error [1]
Thousand acres	*Percent*	*Million cu. ft.*	*Percent*	*Million cu. ft.*	*Percent*
12,493.6	0.5				
3,123.4	1.0	12,250.9	1.5	654.5	1.3
780.8	2.0	6,891.1	2.0	276.5	2.0
347.0	3.0	3,062.7	3.0	122.9	3.0
195.2	4.0	1,722.8	4.0	69.1	4.0
124.9	5.0	1,102.6	5.0	44.2	5.0
31.2	10.0	275.6	10.0	11.1	10.0
13.9	15.0	122.5	15.0	4.9	15.0
7.8	20.0	68.9	20.0	2.8	20.0
5.0	25.0	44.1	25.0	1.8	25.0

[1] By random-sampling formula.

DEFINITIONS OF TERMS

Acceptable trees.—Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.

Available cut.—The volume of timber that would be available for cutting on commercial forest land during a given period under specified assumptions concerning growth, cut, mortality, and forest management practices.

Basal area.—The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand, usually expressed as square feet of basal area per acre.

Commercial forest land.—Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

Commercial species.—Tree species suitable for industrial wood products.

Cropland.—Land under cultivation within the past 24 months, including orchards and land in soil-improving crops, but excluding land cultivated in developing improved pasture. Also includes idle farmland.

Desirable trees.—Growing-stock trees of commercial species having no serious defects in quality that limit present or prospective use for timber products, of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age.

Diameter class.—A classification of trees based on diameter outside bark, measured at breast height (4½ feet above the ground). D.b.h. is the common abbreviation for "diameter at breast height." Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.00 through 6.99 inches d.b.h., inclusive.

Farm.—Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totaled $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for the year amounted to at least $250.

Farm operator.—A person who operates a farm, either doing the work himself or directly supervising the work.

Farmer-owned lands.—Lands owned by farm operators.

Forest industry lands.—Lands owned by companies or individuals operating wood-using plants.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest type.—A classification of forest land based upon the species forming a plurality of live-tree stocking.

White pine-hemlock.—Forests in which eastern white pine or hemlock, singly or in combination, comprises a plurality of the stocking. (Common associates include birch and maple.)

Longleaf-slash pine.—Forests in which longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Loblolly-shortleaf pine.—Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, comprise a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Oak-pine.—Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.—Forests in which upland oaks or hickory, singly or in combination, comprises a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress.—Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprises a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood.—Forests in which elm, ash, or cottonwood, singly or in combination, comprises a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Gross growth.—Annual increase in net volume of trees in the absence of cutting and mortality.

Growing-stock trees.—Live trees of commercial species qualifying as desirable or acceptable trees.

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. (Net volume in primary forks is included.)

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Soft hardwoods.—Soft-textured hardwoods such as boxelder, red and silver maple, buckeye, hack-

berry, loblolly-bay, silverbell (in mts.), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm.

Hard hardwoods.—Hard-textured hardwoods such as Florida and sugar maple, birch, hickory, dogwood, persimmon (forest grown), beech, ash, honeylocust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Idle farmland.—Includes former croplands, orchards, improved pastures and farm sites not tended within the past 2 years, and presently less than 16.7 percent stocked with trees.

Improved pasture.—Land currently improved for grazing by cultivation, seeding, irrigation, or clearing of trees or brush.

Industrial wood.—All roundwood products except fuelwood.

Ingrowth.—The number or net volume of trees that grow large enough during a specified year to qualify as saplings, poletimber, or sawtimber.

Inhibiting vegetation.—Cover sufficiently dense to prevent the establishment of tree seedlings.

Land area.

Bureau of the Census.—The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, resorvoirs, and ponds less than 40 acres in area.

Forest Survey.—The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet, and minimum size of lakes, etc., is 1 acre.

Log grade.—A classification of logs based on external characteristics as indicators of quality or value.

Logging residues.—The unused portions of trees cut or killed by logging.

Miscellaneous Federal lands.—Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

Miscellaneous private lands—corporate.—Lands owned by private corporations other than forest industry.

Miscellaneous private lands—individual.—Privately owned lands other than forest industry, farmer-owned, or corporate lands.

Mortality.—Number or sound-wood volume of live trees dying from natural causes during a specified period.

National Forest land.—Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Net annual growth.—The increase in volume for a specific year.

Net volume.—Gross volume of wood less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial forest land.—(a) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and (b) productive-reserved forest land.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land.—Land that has never supported forests and lands formerly forested where timber production is precluded by development for other uses.

Nonstocked land.—Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Other Federal lands.—Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

Other public lands.—Publicly owned lands other than National Forests.

Other removals.—The net volume of growing-stock trees removed from the inventory by cultural operations, such as timber stand improvement, land clearing, and other changes in land use that result in the removal of the trees from the commercial forest.

Overstocked areas.—Areas where growth of trees is significantly reduced by excessive numbers of trees.

Plant byproducts.—Wood products, such as pulp chips, obtained incidental to production of other manufactured products.

Plant residues.—Wood materials from manufacturing plants not utilized for some product.

Poletimber trees.—Growing-stock trees of commercial species at least 5.0 inches in d.b.h. but smaller than sawtimber size.

Productive-reserved forest land.—Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation.

Quality class.—A classification of sawtimber volumes by log or tree grades.

Rangeland.—Land on which the natural plant cover is composed principally of native grasses, forbs, or shrubs valuable for forage.

Rotten trees.—Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively, primarily because of rot or missing sections, and with less than one-third of the gross tree volume in sound material.

Rough trees.—(a) Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively, primarily because of roughness, poor form, splits, and cracks, and with less than one-third of the gross tree volume in sound material; and (b) all live trees of noncommercial species.

Roundwood products.—Logs, bolts, or other round sections cut from trees for industrial or consumer uses.

Salvable dead trees.—Standing or down dead trees that are considered merchantable by Forest Survey standards.

Saplings.—Live trees 1.0 inch to 5.0 inches in diameter at breast height.

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, and with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods).

Saw-log portion.—That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber trees.—Live trees of commercial species containing at least a 12-foot saw log and with at least one-third of the gross board-foot volume between the 1-foot stump and minimum saw-log top being sound. Softwoods must be at least 9.0 inches and hardwoods at least 11.0 inches in diameter at breast height.

Sawtimber volume.—Net volume of the saw-log portion of live sawtimber in board-foot International ¼-inch rule.

Seedlings.—Live trees less than 1.0 inch in diameter at breast height that are expected to survive and develop.

Site class.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Class 1.—Sites capable of producing 165 or more cubic feet per acre annually.

Class 2.—Sites capable of producing 120 to 165 cubic feet per acre annually.

Class 3.—Sites capable of producing 85 to 120 cubic feet per acre annually.

Class 4.—Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 5.—Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Pines.—Yellow pine species which include loblolly, longleaf, slash, pond, shortleaf, pitch, Virginia, Table-Mountain, sand, and spruce pine.

Other softwoods.—White pine, hemlock, cypress, eastern redcedar, whitecedar, spruce, and fir.

Stand-size class.—A classification of forest land based on the diameter class of growing-stock trees on the area.

Sawtimber stands.—Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber and poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.—Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and seedlings.

State, county, and municipal lands.—Lands owned by States, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Stocking.—The degree of occupancy of land by trees, measured by basal area or the number of trees in a stand and spacing in the stand, compared to a minimum standard of approximately 75 square feet of basal area per acre, depending on tree size, to fully utilize the growth potential of the land.

Fully stocked.—100 percent or more stocking

Medium stocked.—60 to 100 percent stocking

Poorly stocked.—Less than 60 percent stocking

Survivor growth.—The increase in volume of growing-stock trees that survive cutting and mortality for a specified year.

Timber products.—Roundwood products and plant byproducts.

Timber removals.—The net volume of growing-stock trees removed from the inventory by harvesting; cultural operations, such as stand improvement; land clearing, or changes in land use.

Unproductive forest land.—Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

Upper-stem portion.—That part of the main stem or fork of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

Urban and other areas.—Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

CONVERSION FACTORS

Cubic feet of wood per average cord (excluding bark)

D.b.h.	Pine	Other softwoods	Hardwood
6	60.9	68.1	59.6
8	68.0	76.2	68.2
10	72.9	81.2	73.2
12	76.5	85.2	76.3
14	79.3	88.0	78.3
16	81.5	90.3	79.7
18	83.2	92.2	80.7
20	84.7	93.6	81.5
22	86.7	96.1	82.5
24+	90.0	100.5	83.8
Average	74.2	86.3	74.9

Rough cords per M cubic feet (without bark) = $a+b\left(\frac{1}{\text{D.b.h.}}\right)+c\left(\frac{1}{\text{D.b.h.}}\right)^2$

Where		*Pine*	*Other softwoods*	*Hardwood*
a	=	10.01850	9.15960	11.68410
b	=	34.42135	28.75793	3.74431
c	=	22.73994	25.54418	157.39417

INDEX TO DETAILED TABLES

Area

1. Area by land classes
2. Area of commercial forest land, by ownership classes
3. Area of commercial forest land, by stand-size and ownership classes
4. Area of commercial forest land, by stand-volume and ownership classes
5. Area of commercial forest land, by stocking classes based on selected stand components
6. Area of commercial forest land, by ownership and stocking classes, with percent occupancy by selected stand components
7. Area of commercial forest land, by site and ownership classes
8. Area of commercial forest land, by forest types and ownership classes
9. Area of noncommercial forest land, by forest types

Volume

10. Number of growing-stock trees on commercial forest land, by species and diameter classes
11. Volume of timber on commercial forest land, by class of timber and by softwood and hardwood.
12. Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
13. Volume of growing stock on commercial forest land, by species and diameter classes
14. Volume of sawtimber on commercial forest land, by species and diameter classes
15. Volume of sawtimber on commercial forest land, by species and quality classes

Growth, Removals, and Mortality

16. Net annual growth and removals of growing stock on commercial forest land, by species
17. Net annual growth and removals of growing stock on commercial forest land, by ownership classes and by softwood and hardwood
18. Net annual growth and removals of sawtimber on commercial forest land, by species
19. Net annual growth and removals of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
20. Mortality of growing stock and sawtimber on commercial forest land, by species
21. Mortality of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood
22. Mortality of growing stock and sawtimber on commercial forest land, by causes, and by softwood and hardwood

Utilization

23. Output of timber products, by product, by source of material, and by softwood and hardwood
24. Output of roundwood products, by product, by source, and by softwood and hardwood
25. Annual timber removals from growing stock on commercial forest land, by items, and by softwood and hardwood
26. Annual timber removals from live sawtimber on commercial forest land, by items, and by softwood and hardwood
27. Volume of unused residues at primary manufacturing plants, by industry and type of residue, and by softwood and hardwood

Projections

28. Projections of net annual growth, available cut and inventory of sawtimber and growing stock on commercial forest land, by softwood and hardwood

Supplemental Tables

29. Basal area per acre of growing stock and rough and rotten trees 5.0 inches d.b.h. and larger, by forest type and Survey Unit
30. Number of growing stock and rough and rotten trees 1.0-4.9 inches d.b.h. per acre, by forest type and Survey Unit
31. Area of commercial forest land, by stand volume (board feet) and ownership classes, by physiographic classes
32. Area of commercial forest land, by stand-volume (cubic feet) and ownership classes, by physiographic classes
33. Average net volume and growth per acre on commercial forest land, by physiographic class, tree class, and species group
34. Land area, by class, major forest type, and survey completion date, 1947, 1958, and 1968
35. Volume of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date, 1947, 1958, and 1968
36. Volume of all live timber, by species group and Survey Unit, 1947, 1958, and 1968

Table 1.—*Area by land classes, South Carolina, 1968*

Land class	Area
	Thousand acres
Forest land:	
Commercial	12,410.7
Productive-reserved	70.3
Unproductive	12.6
Total	12,493.6
Nonforest land:	
Cropland	4,033.7
Pasture and range	1,027.2
Other [1]	1,811.5
Total	6,872.4
All land [2]	19,366.0

[1] Includes swampland, industrial and urban areas, other nonforest land, and 191,700 acres classed as water by Forest Survey standards but defined by Bureau of Census as land.
[2] From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

Table 2.—*Area of commercial forest land, by ownership classes, South Carolina, 1968*

Ownership class	Area
	Thousand acres
National Forest	550.9
Other Federal:	
Bureau of Land Management	.
Indian	.
Miscellaneous Federal	289.6
Total other Federal	289.6
State	205.8
County and municipal	26.9
Forest industry [1]	2,047.4
Farmer-owned	4,995.6
Miscellaneous private:	
Individual	3,963.4
Corporate	331.1
Total miscellaneous private	4,294.5
All ownerships	12,410.7

[1] Not including 9,100 acres of farmer-owned and miscellaneous private lands leased to forest industry.

Table 3.—*Area of commercial forest land, by stand-size and ownership classes, South Carolina, 1968*

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
Sawtimber	4,907.6	368.0	213.6	880.0	3,446.0
Poletimber	3,455.2	136.9	132.9	511.4	2,674.0
Sapling and seedling	3,649.4	46.0	153.4	613.6	2,836.4
Nonstocked	398.5	.	22.4	42.4	333.7
All classes	12,410.7	550.9	522.3	2,047.4	9,290.1

Table 4.—*Area of commercial forest land, by stand-volume and ownership classes, South Carolina, 1968*

Stand volume per acre [1]	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
Less than 1,500 board feet	6,046.9	71.3	262.2	927.4	4,786.0
1,500 to 5,000 board feet	3,864.9	208.2	151.6	573.3	2,931.8
More than 5,000 board feet	2,498.9	271.4	108.5	546.7	1,572.3
All classes	12,410.7	550.9	522.3	2,047.4	9,290.1

[1] International ¼-inch rule.

Table 5.—*Area of commercial forest land, by stocking classes based on selected stand components, South Carolina, 1968*

Stocking percentage	Stocking classified in terms of:					
	All live trees	Growing-stock trees			Rough and rotten trees	Inhibiting vegetation
		Total	Desirable	Acceptable		
	Thousand acres					
160	40.0	.	.	.	.	
150-159	97.0	9.3	...	.	.	.
140-149	212.0	43.7	.	2.6	.	.
130-139	606.7	136.6	4.3	7.4	.	.
120-129	1,271.2	280.7	4.8	25.4	7.6	.
110-119	2,119.1	587.5	11.8	68.8	28.1	.
100-109	2,416.4	1,014.2	69.2	123.7	37.7	.
90-99	1,921.9	1,490.5	124.3	194.6	86.0	.
80-89	1,481.3	2,020.7	346.6	313.8	70.1	.
70-79	869.5	1,830.4	648.1	486.1	128.2	.
60-69	581.1	1,540.2	973.6	862.5	323.4	5.8
50-59	298.8	1,268.2	1,456.1	1,094.9	611.1	24.1
40-49	194.1	812.8	1,912.8	1,617.2	1,109.9	38.5
30-39	120.2	501.0	1,985.5	2,001.0	1,839.5	74.1
20-29	96.3	408.3	1,980.1	2,126.5	2,490.4	171.3
10-19	42.9	228.8	1,685.5	1,872.6	2,960.1	450.4
Less than 10	42.2	237.8	1,208.0	1,613.6	2,718.6	11,646.5
Total	12,410.7	12,410.7	12,410.7	12,410.7	12,410.7	12,410.7

Table 6.—*Area of commercial forest land, by ownership and stocking classes,[1] with percent occupancy by selected stand components, South Carolina, 1968*

Ownership and stocking class	Area	Stand components					
		Growing-stock trees			Rough and rotten trees	Inhibiting vegetation	Nonstocked
		Total	Desirable	Acceptable			
	M acres	*Percent of area*					
National Forest:							
Fully stocked stands	182.2	89.5	36.0	53.5	10.1	(2)	0.4
Medium stocked stands	269.1	76.3	36.5	39.8	18.9	0.9	3.9
Poorly stocked stands	99.6	48.7	20.4	28.3	26.3	4.3	20.7
All stands	550.9	76.6	33.8	42.8	16.9	1.2	5.3
Other public:							
Fully stocked stands	82.3	92.1	38.7	53.4	7.7	(2)	0.2
Medium stocked stands	276.4	74.3	40.5	33.8	18.8	0.9	6.0
Poorly stocked stands	163.6	33.8	17.2	16.6	41.3	1.5	23.4
All stands	522.3	65.2	33.2	32.0	23.6	0.9	10.3
Forest industry:							
Fully stocked stands	480.4	88.8	40.4	48.4	10.8	0.2	0.2
Medium stocked stands	1,206.1	73.2	41.1	32.1	20.5	1.0	5.3
Poorly stocked stands	360.9	39.6	23.2	16.4	33.5	4.2	22.7
All stands	2,047.4	71.3	37.8	33.5	20.3	1.3	7.1
Farmer & misc. private:							
Fully stocked stands	1,327.1	89.2	43.9	45.3	10.1	0.1	0.6
Medium stocked stands	5,130.2	72.6	38.4	34.2	21.3	1.0	5.1
Poorly stocked stands	2,832.8	37.7	20.8	16.9	37.4	3.5	21.4
All stands	9,290.1	65.0	34.1	30.9	24.2	1.6	9.2
All ownerships:							
Fully stocked stands	2,072.0	89.3	42.1	47.2	10.2	0.1	0.4
Medium stocked stands	6,881.8	72.9	39.0	33.9	20.9	1.0	5.2
Poorly stocked stands	3,456.9	38.0	20.9	17.1	36.8	3.5	21.7
All stands	12,410.7	66.7	34.8	31.9	23.1	1.5	8.7

[1] Based on degree of growing-stock stocking.
[2] Negligible.

Table 7.—*Area of commercial forest land, by site and ownership classes, South Carolina, 1968*

Site class	All ownerships	National Forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
165 cu. ft. or more	23.2	.	.	7.8	15.4
120 to 165 cu. ft.	274.0	25.4	4.0	49.6	195.0
85 to 120 cu. ft.	2,145.5	123.5	53.0	500.5	1,468.5
50 to 85 cu. ft.	7,429.2	340.2	298.5	1,161.2	5,629.3
Less than 50 cu. ft.	2,538.8	61.8	166.8	328.3	1,981.9
All classes	12,410.7	550.9	522.3	2,047.4	9,290.1

Table 8.—*Area of commercial forest land, by forest types and ownership classes, South Carolina, 1968*

Type	All ownerships	Public	Private
	Thousand acres		
Softwood types:			
White pine-hemlock	8.7	.	8.7
Longleaf pine	507.3	118.9	388.4
Slash pine	574.2	72.6	501.6
Loblolly pine [1]	2,916.5	327.6	2,588.9
Shortleaf pine	875.0	102.1	772.9
Virginia pine	162.6	10.9	151.7
Redcedar	90.0	1.2	88.8
Pond pine	385.4	40.7	344.7
Pitch pine	4.6	.	4.6
Total	5,524.3	674.0	4,850.3
Hardwood types:			
Oak-pine	2,124.8	154.0	1,970.8
Oak-hickory	2,300.5	98.5	2,202.0
Southern scrub oak	356.9	29.8	327.1
Oak-gum-cypress	1,817.3	83.3	1,734.0
Elm-ash-cottonwood	286.9	33.6	253.3
Total	6,886.4	399.2	6,487.2
All types	12,410.7	1,073.2	11,337.5

[1] Includes 5,600 acres of spruce pine type.

Table 9.—*Area of noncommercial forest land, by forest types, South Carolina, 1968*

Type	All areas	Productive-reserved areas	Unproductive areas
		Thousand acres	
White pine-hemlock	.	.	.
Longleaf-slash pine	3.4	3.4	.
Loblolly-shortleaf pine	2.5	2.5	.
Oak-pine	12.4	12.4	.
Oak-hickory	59.1	50.4	8.7
Oak-gum-cypress	5.5	1.6	3.9
Elm-ash-cottonwood	.	.	.
All types	82.9	70.3	12.6

Table 10.—*Number of growing-stock trees on commercial forest land, by species and diameter classes, South Carolina, 1968*

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
					Thousand trees						
Softwood:											
Longleaf pine	65,849	22,845	15,869	12,683	8,094	4,071	1,612	493	115	63	4
Slash pine	52,295	37,950	8,925	3,248	1,055	674	316	71	40	16	
Shortleaf pine	142,678	75,997	38,454	16,416	7,426	2,966	899	354	126	40	
Loblolly pine	349,740	154,338	77,592	47,560	30,051	18,877	10,949	5,266	2,828	2,212	67
Virginia pine	21,372	11,257	5,666	2,825	1,100	396	72	27	17	12	
Pitch pine	914	350	343	92	89	15	25				
Pond pine	48,660	19,525	11,663	7,985	5,280	2,175	1,162	554	192	124	
Spruce pine	2,320	783	644	268	263	135	82	73	44	28	
Table-Mountain pine	102		41		19		25	10	7		
Eastern white pine	1,213	466	308	39	252	44	14	28	9	49	4
Eastern hemlock	358	205	84		43			20		6	
Cypress	23,312	6,232	4,671	3,616	3,344	2,370	1,390	831	393	387	78
Other eastern softwoods	11,192	7,728	2,216	835	256	101	24	11	12	9	
Total softwoods	720,005	337,676	166,476	95,567	57,272	31,824	16,570	7,738	3,783	2,946	153
Hardwood:											
Select white oaks [1]	36,778	15,362	9,147	4,794	3,079	2,028	1,030	606	306	382	44
Select red oaks [2]	9,259	2,505	2,441	1,450	1,027	826	377	247	163	206	17
Other white oaks	20,749	8,569	4,470	3,109	1,664	1,165	721	361	272	338	80
Other red oaks	108,761	45,588	25,840	15,349	8,585	5,208	3,219	2,096	1,134	1,543	199
Hickory	23,601	9,942	5,375	2,747	2,172	1,454	755	543	297	279	37
Hard maple	452	194	41	119	51	30		10	7		
Soft maple	29,088	12,763	6,737	3,581	2,364	1,519	934	592	273	307	18
Beech	1,052	253	335	123	48	69	29	104	27	61	3
Sweetgum	111,081	52,421	24,865	12,846	8,718	5,527	3,163	1,812	915	747	67
Tupelo and blackgum	84,093	22,929	18,480	14,856	10,994	7,732	4,802	2,314	1,061	875	50
Ash	18,329	7,574	4,154	2,653	1,657	999	692	321	96	177	6
Cottonwood	2,673	994	451	500	211	192	143	58	35	63	26
Basswood	52			26	12		14				
Yellow-poplar	22,976	7,447	5,112	3,417	2,717	1,789	1,120	715	352	280	27
Black walnut	217	60	43	62		32			14	6	
Black cherry	998	676	250	55	10		7				
Elm	13,682	5,072	4,027	2,070	1,083	626	335	246	94	121	8
Sycamore	1,826	251	379	314	330	123	146	119	65	87	12
Birch (except yellow)	4,762	1,624	1,446	580	534	269	97	103	62	47	
Other eastern hardwoods	10,534	5,087	2,132	1,478	797	454	250	170	94	61	11
Total hardwoods	500,963	199,311	115,725	70,129	46,053	30,042	17,834	10,417	5,267	5,580	605
All species	1,220,968	536,987	282,201	165,696	103,325	61,866	34,404	18,155	9,050	8,526	758

[1] Includes white, swamp white, and swamp chestnut oaks.
[2] Includes cherrybark, northern red, and Shumard oaks.

Table 11.—*Volume of timber on commercial forest land, by class of timber and by softwood and hardwood, South Carolina, 1968*

Class of timber	All species	Softwood	Hardwood
	– – *Million cubic feet* – –		
Sawtimber trees:			
Saw-log portion	8,049.4	4,283.9	3,765.5
Upper-stem portion	804.4	318.7	485.7
Total	8,853.8	4,602.6	4,251.2
Poletimber trees	3,397.1	1,503.2	1,893.9
All growing stock trees	12,250.9	6,105.8	6,145.1
Rough trees:			
Sawtimber-size trees	714.1	65.5	648.6
Poletimber-size trees	983.2	123.5	859.7
Total	1,697.3	189.0	1,508.3
Rotten trees:			
Sawtimber-size trees	416.9	28.6	388.3
Poletimber-size trees	53.0	1.6	51.4
Total	469.9	30.2	439.7
Salvable dead trees:			
Sawtimber-size trees	10.9	7.3	3.6
Poletimber-size trees	12.1	8.2	3.9
Total	23.0	15.5	7.5
Total, all timber	14,441.1	6,340.5	8,100.6

Table 12.—*Volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, South Carolina, 1968*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	– – *Million cubic feet* – –			– – *Million board feet* [1] – –		
National Forest	889.9	622.8	267.1	2,951.7	2,292.0	659.7
Other public	500.6	312.8	187.8	1,442.6	989.6	453.0
Forest industry	2,526.0	1,250.6	1,275.4	7,262.1	3,807.0	3,455.1
Farmer and misc. private	8,334.4	3,919.6	4,414.8	23,359.2	12,378.6	10,980.6
All ownerships	12,250.9	6,105.8	6,145.1	35,015.6	19,467.2	15,548.4

[1] International ¼-inch rule.

Table 13.—*Volume of growing stock on commercial forest land, by species and diameter classes, South Carolina, 1968*

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	– *Million cubic feet* –										
Softwood:											
Longleaf pine	654.2	51.4	92.6	145.1	150.5	113.4	61.4	25.2	7.7	6.1	0.8
Slash pine	214.4	64.4	45.4	38.3	22.5	22.6	13.4	3.6	2.8	1.4	.
Shortleaf pine	786.9	146.3	195.8	165.2	131.3	82.4	36.4	18.3	7.6	3.6	.
Loblolly pine	3,367.8	275.5	400.1	491.2	528.3	519.0	428.3	282.0	198.9	230.1	14.4
Virginia pine	128.1	25.0	33.5	33.2	20.4	10.2	2.7	1.0	1.0	1.1	.
Pitch pine	5.5	0.6	1.6	0.8	1.3	0.5	0.7	.	.	.	.
Pond pine	394.3	37.5	55.1	75.5	84.6	54.7	39.2	25.6	12.0	10.1	.
Spruce pine	30.0	1.5	3.6	2.8	4.9	3.5	3.3	4.4	3.1	2.9	.
Table-Mountain pine	2.4	.	0.3	.	0.4	.	0.8	0.4	0.5	.	.
Eastern white pine	18.1	0.9	1.8	0.4	4.7	1.3	0.5	1.5	0.6	5.7	0.7
Eastern hemlock	3.4	0.3	0.4	.	1.1	.	.	0.9	.	0.7	.
Cypress	455.8	13.9	29.4	46.7	74.8	79.5	64.5	50.2	30.6	44.8	21.4
Other eastern softwoods	44.9	15.2	11.1	8.4	4.6	2.6	0.7	0.5	0.9	0.9	.
Total softwoods	6,105.8	632.5	870.7	1,007.6	1,029.4	889.7	651.9	413.6	265.7	307.4	37.3
Hardwood:											
Select white oaks [1]	403.0	32.2	52.0	52.9	60.0	58.8	42.3	32.8	20.5	40.5	11.0
Select red oaks [2]	140.5	6.0	13.7	15.9	18.3	22.6	14.3	12.9	11.2	22.1	3.5
Other white oaks	240.5	16.4	21.9	29.2	26.6	29.0	25.5	16.9	16.4	38.1	20.5
Other red oaks	1,285.0	101.2	145.6	171.1	164.9	150.4	129.2	115.1	83.1	174.1	50.3
Hickory	283.3	19.2	26.1	29.1	39.3	43.0	31.4	30.4	22.0	33.5	9.3
Hard maple	4.3	0.5	0.2	1.0	0.8	0.9	.	0.3	0.6	.	.
Soft maple	346.4	31.9	43.4	45.6	47.4	48.6	39.0	34.8	20.2	32.1	3.4
Beech	24.2	0.5	1.7	1.5	0.9	1.9	1.2	6.1	1.8	7.8	0.8
Sweetgum	1,165.0	102.0	139.4	150.7	180.0	175.2	137.6	105.6	71.2	86.5	16.8
Tupelo and blackgum	1,258.4	45.7	105.3	177.3	217.7	232.1	193.1	124.3	72.5	81.3	9.1
Ash	221.9	17.7	28.1	34.8	35.6	31.2	28.6	19.0	6.8	18.9	1.2
Cottonwood	54.3	2.5	3.0	6.5	4.8	6.2	7.0	3.6	3.0	8.4	9.3
Basswood	1.0	.	.	0.2	0.2	.	0.6	.	.	.	.
Yellow-poplar	350.5	18.1	31.3	42.2	55.2	52.7	47.7	41.0	25.0	30.2	7.1
Black walnut	3.6	0.2	0.5	0.7	.	0.7	.	.	1.2	0.3	.
Black cherry	4.7	1.8	1.5	0.7	0.2	.	0.5	.	.	.	.
Elm	154.7	11.1	23.1	24.7	21.5	19.2	14.7	15.5	7.1	15.3	2.5
Sycamore	45.6	0.6	2.5	3.9	6.5	3.6	6.3	6.5	4.4	9.0	2.3
Birch (except yellow)	54.4	3.5	9.3	6.3	10.0	7.5	3.8	5.3	3.9	4.8	.
Other eastern hardwoods	103.8	11.1	11.6	17.2	14.9	12.7	10.3	9.6	6.5	7.6	2.3
Total hardwoods	6,145.1	422.2	660.2	811.5	904.8	896.3	733.1	579.7	377.4	610.5	149.4
All species	12,250.9	1,054.7	1,530.9	1,819.1	1,934.2	1,786.0	1,385.0	993.3	643.1	917.9	186.7

[1] Includes white, swamp white, and swamp chestnut oaks.
[2] Includes cherrybark, northern red, and Shumard oaks.

Table 14.—*Volume of sawtimber on commercial forest land, by species and diameter classes, South Carolina, 1968*

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	2,285.2	591.1	678.9	532.0	294.6	122.2	35.6	27.3	3.5
Slash pine	400.9	129.3	89.4	93.9	55.3	15.8	11.6	5.6	.
Shortleaf pine	1,810.6	613.4	541.4	359.1	163.4	84.3	32.8	16.2	.
Loblolly pine	11,543.1	1,788.3	2,193.7	2,275.3	1,932.4	1,293.5	917.3	1,076.4	66.2
Virginia pine	244.7	112.7	75.6	36.6	9.6	2.8	3.6	3.8	.
Pitch pine	12.6	2.6	5.2	2.3	2.5	.	.	.	.
Pond pine	1,288.3	285.5	353.1	244.8	180.9	120.4	56.2	47.4	.
Spruce pine	92.9	8.8	17.8	12.0	12.7	17.2	12.3	12.1	.
Table-Mountain pine	7.8	.	1.2	.	3.3	1.4	1.9	.	.
Eastern white pine	64.0	0.7	17.1	5.6	1.7	7.0	2.8	26.0	3.1
Eastern hemlock	12.5	.	4.6	.	.	4.5	.	3.4	.
Cypress	1,644.5	139.9	264.2	318.4	273.0	224.0	137.6	197.5	89.9
Other eastern softwoods	60.1	25.8	14.9	9.2	2.5	1.8	2.1	3.8	.
Total softwoods	19,467.2	3,698.1	4,257.1	3,889.2	2,931.9	1,894.9	1,213.8	1,419.5	162.7
Hardwood:									
Select white oaks [1]	885.6	.	176.4	199.5	147.9	114.3	71.5	140.8	35.2
Select red oaks [2]	401.7	.	61.9	82.7	56.9	52.3	43.2	91.5	13.2
Other white oaks	604.9	.	86.5	101.3	87.3	60.2	57.4	135.7	76.5
Other red oaks	3,180.3	.	522.6	536.6	489.5	434.0	317.3	680.8	199.5
Hickory	766.4	.	125.4	158.6	114.3	115.0	82.8	133.0	37.3
Hard maple	8.0	.	2.8	2.8	.	0.4	2.0	.	.
Soft maple	718.2	.	128.7	147.9	133.0	116.4	69.2	114.2	8.8
Beech	67.0	.	2.5	6.0	3.1	20.1	6.1	26.5	2.7
Sweetgum	3,090.1	.	585.5	689.7	585.7	468.7	312.5	372.5	75.5
Tupelo and blackgum	3,303.5	.	629.4	813.1	721.2	484.7	291.2	324.9	39.0
Ash	477.4	.	96.4	108.7	99.8	68.4	26.2	72.9	5.0
Cottonwood	157.8	.	13.4	21.7	25.1	14.0	12.6	32.2	38.8
Basswood	3.6	.	0.9	.	2.7	.	.	.	.
Yellow-poplar	1,064.5	.	184.0	209.0	212.7	179.8	110.9	137.0	31.1
Black walnut	8.7	.	.	3.0	.	.	4.5	1.2	.
Black cherry	2.3	.	0.4	.	1.9	.	.	.	.
Elm	330.2	.	64.7	63.6	52.0	55.8	25.8	57.8	10.5
Sycamore	146.0	.	20.9	10.5	26.4	23.6	18.8	38.1	7.7
Birch (except yellow)	100.5	.	24.6	21.6	11.8	14.7	11.7	16.1	.
Other eastern hardwoods	231.7	.	42.9	41.8	39.5	36.6	25.6	36.3	9.0
Total hardwoods	15,548.4	.	2,769.9	3,218.1	2,810.8	2,259.0	1,489.3	2,411.5	589.8
All species	35,015.6	3,698.1	7,027.0	7,107.3	5,742.7	4,153.9	2,703.1	3,831.0	752.5

[1] Includes white, swamp white, and swamp chestnut oaks.
[2] Includes cherrybark, northern red, and Shumard oaks.

Table 15.—*Volume of sawtimber on commercial forest land, by species and quality classes, South Carolina, 1968*

Species	All grades	Log or tree grade			
		1	2	3	4
	Million board feet				
Softwood:					
Yellow pines [1]	17,686.1	4,643.1	3,059.9	9,983.1	([2])
Eastern white pine [3]	64.0	.	8.7	33.8	21.5
Other eastern softwoods	1,717.1	330.6	608.8	770.6	7.1
Total	19,467.2	4,973.7	3,677.4	10,787.5	28.6
Hardwood: [4]					
Select white and red oaks	1,287.3	193.2	300.6	565.6	227.9
Other white and red oaks	3,785.2	631.4	795.2	1,673.3	685.3
Hickory	766.4	97.9	154.8	360.1	153.6
Hard maple	8.0	.	1.5	2.8	3.7
Sweetgum	3,090.1	423.8	732.7	1,484.7	448.9
Ash, walnut, and black cherry	488.4	66.4	129.5	267.0	25.5
Yellow-poplar	1,064.5	165.6	182.2	444.8	271.9
Other hardwoods	5,058.5	1,013.7	1,136.0	2,628.1	280.7
Total	15,548.4	2,592.0	3,432.5	7,426.4	2,097.5
All species	35,015.6	7,565.7	7,109.9	18,213.9	2,126.1

[1] Based on *Southern Pine Tree Grades for Yard and Structural Lumber*, Research Paper SE-40, published by the Southeastern Forest Experiment Station in 1968.
[2] Not applicable.
[3] Based on *Trial Log Grades for Eastern White Pine* prepared by the Northeastern Forest Experiment Station in 1960.
[4] Graded according to *Hardwood Log Grades for Standard Lumber* published by the U. S. Forest Products Laboratory in 1953. Specifications for the grade 4 tie and timber logs are based chiefly on knot size and log soundness.

Table 16.—*Net annual growth and removals of growing stock on commercial forest land, by species, South Carolina, 1967*

Species	Net annual growth	Annual timber removals
	Million cubic feet	
Softwood:		
Yellow pines	396.5	274.8
Eastern white pine	1.1	3.2
Cypress	10.9	7.7
Other eastern softwoods	3.9	2.0
Total	412.4	287.7
Hardwood:		
Select white and red oaks	24.7	14.3
Other white and red oaks	73.0	29.2
Hickory	9.1	5.0
Hard maple	0.1	0.2
Sweetgum	48.5	36.0
Ash, walnut, and black cherry	7.8	5.1
Yellow-poplar	21.3	14.6
Other hardwoods	57.6	49.6
Total	242.1	154.0
All species	654.5	441.7

Table 17.—*Net annual growth and removals of growing stock on commercial forest land, by ownership classes and by softwood and hardwood, South Carolina, 1967*

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet					
National Forest	41.9	32.0	9.9	18.1	17.5	0.6
Other public	30.8	22.6	8.2	7.8	4.7	3.1
Forest industry	136.6	91.0	45.6	106.3	74.4	31.9
Farmer and misc. private	445.2	266.8	178.4	309.5	191.1	118.4
All ownerships	654.5	412.4	242.1	441.7	287.7	154.0

Table 18.—*Net annual growth and removals of sawtimber on commercial forest land, by species, South Carolina, 1967*

Species	Net annual growth	Annual timber removals
	Million board feet	
Softwood:		
Yellow pines	1,342.1	927.0
Eastern white pine	3.1	15.9
Cypress	49.9	33.7
Other eastern softwoods	2.6	2.6
Total	1,397.7	979.2
Hardwood:		
Select white and red oaks	71.1	47.6
Other white and red oaks	189.6	83.6
Hickory	23.3	16.3
Hard maple	0.2	.
Sweetgum	139.0	119.6
Ash, walnut, and black cherry	22.3	13.0
Yellow-poplar	74.7	52.9
Other hardwoods	175.4	165.5
Total	695.6	498.5
All species	2,093.3	1,477.7

Table 19.—*Net annual growth and removals of sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, South Carolina, 1967*

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million board feet					
National Forest	156.1	128.6	27.5	67.6	65.5	2.1
Other public	104.7	81.5	23.2	22.6	12.8	9.8
Forest industry	454.3	314.4	139.9	355.6	252.6	103.0
Farmer and misc. private	1,378.2	873.2	505.0	1,031.9	648.3	383.6
All ownerships	2,093.3	1,397.7	695.6	1,477.7	979.2	498.5

Table 20.—*Mortality of growing stock and sawtimber on commercial forest land, by species, South Carolina, 1967*

Species	Growing stock	Sawtimber
	Million cu. ft.	*Million bd. ft.*
Softwood:		
Yellow pines	28.1	71.5
Eastern white pines	.	..
Cypress	1.2	2.9
Other eastern softwoods	0.4	1.3
Total	29.7	75.7
Hardwood:		
Select white and red oaks	2.0	6.9
Other white and red oaks	13.0	36.3
Hickory	2.2	8.9
Hard maple	.	...
Sweetgum	5.7	16.5
Ash, walnut, and black cherry	1.8	2.4
Yellow-poplar	0.5	0.8
Other hardwoods	12.6	28.1
Total	37.8	99.9
All species	67.5	175.6

Table 21.—*Mortality of growing stock and sawtimber on commercial forest land, by ownership classes and by softwood and hardwood, South Carolina, 1967*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
National Forest	6.0	4.4	1.6	17.4	11.9	5.5
Other public	3.6	0.8	2.8	8.8	2.7	6.1
Forest industry	12.5	5.4	7.1	29.8	12.6	17.2
Farmer and misc. private	45.4	19.1	26.3	119.6	48.5	71.1
All ownerships	67.5	29.7	37.8	175.6	75.7	99.9

Table 22.—*Mortality of growing stock and sawtimber on commercial forest land, by causes and by softwood and hardwood, South Carolina, 1967*

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			*Million board feet*		
Fire	2.1	1.1	1.0	4.0	1.1	2.9
Insects	2.7	2.7	.	7.9	7.9	.
Disease	8.4	6.1	2.3	17.7	11.4	6.3
Other	20.8	8.3	12.5	49.6	18.0	31.6
Unknown	33.5	11.5	22.0	96.4	37.3	59.1
All causes	67.5	29.7	37.8	175.6	75.7	99.9

Table 23.—*Output of timber products, by product, by source of material, and by softwood and hardwood, South Carolina, 1967*

Product and species group	Standard units	Total output		Roundwood products		Plant byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Saw logs:							
Softwood	M bd. ft. [1]	710,677	111,572	710,677	111,572		
Hardwood	M bd. ft. [1]	275,986	42,838	274,950	42,605	[4] 1,036	[4] 233
Total	M bd. ft. [1]	986,663	154,410	985,627	154,177	[4] 1,036	[4] 233
Veneer logs and bolts:							
Softwood	M bd. ft. [1]	5,599	851	5,599	851		
Hardwood	M bd. ft. [1]	81,448	12,135	81,448	12,135		
Total	M bd. ft. [1]	87,047	12,986	87,047	12,986		
Pulpwood:							
Softwood	Std. cords [2]	2,204,846	163,599	1,776,068	131,784	428,778	31,815
Hardwood	Std. cords [2]	742,657	52,803	595,284	42,325	147,373	10,478
Total	Std. cords [2]	2,947,503	216,402	2,371,352	174,109	576,151	42,293
Cooperage:							
Softwood	M bd. ft. [1]						
Hardwood	M bd. ft. [1]	1,892	207	1,892	207		
Total	M bd. ft. [1]	1,892	207	1,892	207		
Piling:							
Softwood	M linear ft.	8,558	3,673	8,558	3,673		
Hardwood	M linear ft.						
Total	M linear ft.	8,558	3,673	8,558	3,673		
Poles:							
Softwood	M pieces	170	2,552	170	2,552		
Hardwood	M pieces						
Total	M pieces	170	2,552	170	2,552		
Mine timbers (round):							
Softwood	M cu. ft.						
Hardwood	M cu. ft.						
Total	M cu. ft.						
Posts (round and split):							
Softwood	M pieces	1,789	1,399	1,789	1,399		
Hardwood	M pieces	342	204	342	204		
Total	M pieces	2,131	1,603	2,131	1,603		
Other: [3]							
Softwood	M cu. ft.	1,558	1,558	1,520	1,520	38	38
Hardwood	M cu. ft.	218	218	21	21	197	197
Total	M cu. ft.	1,776	1,776	1,541	1,541	235	235
Total industrial products:							
Softwood			285,204		253,351		31,853
Hardwood			108,405		97,497		10,908
Total			393,609		350,848		42,761
Fuelwood: [4]							
Softwood	Std. cords	297,453	22,071	271,051	20,112	26,402	1,959
Hardwood	Std. cords	445,149	31,650	419,973	29,860	25,176	1,790
Total	Std. cords	742,602	53,721	691,024	49,972	51,578	3,749
All products:							
Softwood			307,275		273,463		33,812
Hardwood			140,055		127,357		12,698
Total			447,330		400,820		46,510

[1] International ¼-inch rule.
[2] Rough-wood basis (includes chips converted to equivalent standard cords).
[3] Includes hewn ties, excelsior bolts, shingle bolts, turnery bolts, and chemical wood.
[4] Excludes approximately 6,310 thousand cubic feet of plant byproducts used for industrial fuel.
[5] Veneer cores sawed into lumber.

Table 24.—*Output of roundwood products, by product, by source, and by softwood and hardwood, South Carolina, 1967*

Product and species group	All sources	Growing-stock trees [1]			Rough and rotten trees [1]	Salvable dead trees [1]	Other sources [2]
		Total	Saw-timber	Pole-timber			
	Thousand cubic feet						
Saw logs:							
Softwood	111,572	110,294	107,469	2,825	80		1,198
Hardwood	42,605	40,325	39,711	614	2,117		163
Total	154,177	150,619	147,180	3,439	2,197		1,361
Veneer logs and bolts:							
Softwood	851	844	844	.	.		7
Hardwood	12,135	12,041	12,041		.		94
Total	12,986	12,885	12,885				101
Pulpwood:							
Softwood	131,784	121,101	67,158	53,943	2,621	1,749	6,313
Hardwood	42,325	36,100	21,049	15,051	3,116	448	2,661
Total	174,109	157,201	88,207	68,994	5,737	2,197	8,974
Cooperage:							
Softwood					.		. .
Hardwood	207	206	206	. . .	. . .	. . .	1
Total	207	206	206	. . .	. . .	. . .	1
Piling:							
Softwood	3,673	3,594	3,594	. . .	. . .	. . .	79
Hardwood					. . .		. . .
Total	3,673	3,594	3,594	. . .	. . .	. . .	79
Poles:							
Softwood	2,552	2,499	2,499	. . .	. . .	. . .	53
Hardwood				.	. . .	.	. .
Total	2,552	2,499	2,499	. . .	. . .	. . .	53
Mine timbers (round):							
Softwood	. .	. . .		. . .	. . .	. . .	. .
Hardwood				. .	.		.
Total	. .	. . .	. . .	. . .	. .	. . .	. .
Posts (round and split):							
Softwood	1,399	1,256	300	956	58	5	80
Hardwood	204	107	19	88	88		9
Total	1,603	1,363	319	1,044	146	5	89
Other:							
Softwood	1,520	1,474	1,277	197	9	11	26
Hardwood	21	19	16	3	2		. .
Total	1,541	1,493	1,293	200	11	11	26
Total industrial products:							
Softwood	253,351	241,062	183,141	57,921	2,768	1,765	7,756
Hardwood	97,497	88,798	73,042	15,756	5,323	448	2,928
Total	350,848	329,860	256,183	73,677	8,091	2,213	10,684
Fuelwood:							
Softwood	20,112	17,238	4,422	12,816	1,617		1,257
Hardwood	29,860	18,669	10,885	7,784	9,128	58	2,005
Total	49,972	35,907	15,307	20,600	10,745	58	3,262
All products:							
Softwood	273,463	258,300	187,563	70,737	4,385	1,765	9,013
Hardwood	127,357	107,467	83,927	23,540	14,451	506	4,933
Total	400,820	365,767	271,490	94,277	18,836	2,271	13,946

[1] On commercial forest land

[2] Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, or material from noncommercial forest land or nonforest land such as fence rows or suburban areas.

Table 25.—*Annual timber removals from growing stock on commercial forest land, by items, and by softwood and hardwood, South Carolina, 1967*

Item	All species	Softwood	Hardwood
	– *Thousand cubic feet* –		
Roundwood products:			
Saw logs	150,619	110,294	40,325
Veneer logs and bolts	12,885	844	12,041
Pulpwood	157,201	121,101	36,100
Cooperage logs and bolts	206		206
Piling	3,594	3,594	
Poles	2,499	2,499	
Mine timbers			
Posts	1,363	1,256	107
Other	1,493	1,474	19
Fuelwood	35,907	17,238	18,669
All products	365,767	258,300	107,467
Logging residues	43,600	16,409	27,191
Other removals	32,358	13,006	19,352
Total removals	441,725	287,715	154,010

Table 26.—*Annual timber removals from live sawtimber on commercial forest land, by items, and by softwood and hardwood, South Carolina, 1967*

Item	All species	Softwood	Hardwood
	– *Thousand board feet* –		
Roundwood products:			
Saw logs	702,679	527,760	174,919
Veneer logs and bolts	63,206	5,121	58,085
Pulpwood	391,245	301,573	89,672
Cooperage logs and bolts	1,300		1,300
Piling	18,747	18,747	
Poles	13,035	13,035	
Mine timbers			
Posts	1,315	1,218	97
Other	5,996	5,920	76
Fuelwood	74,672	28,298	46,374
All products	1,272,195	901,672	370,523
Logging residues	124,310	37,685	86,625
Other removals	81,146	39,843	41,303
Total removals	1,477,651	979,200	498,451

Table 27.—*Volume of unused residues at primary manufacturing plants, by industry and type of residue, and by softwood and hardwood, South Carolina, 1967*

Species group and type of residues	All industries	Lumber	Veneer and plywood	Other
	– – – – – *Thousand cubic feet* – – – – –			
Softwood:				
Coarse [1]	1,623	1,619		4
Fine [2]	12,776	12,683	25	68
Total	14,399	14,302	25	72
Hardwood:				
Coarse [1]	2,038	1,963	16	59
Fine [2]	5,956	5,718	150	88
Total	7,994	7,681	166	147
All species:				
Coarse [1]	3,661	3,582	16	63
Fine [2]	18,732	18,401	175	156
Total	22,393	21,983	191	219

[1] Material, such as slabs, edgings, and veneer cores.
[2] Material, such as sawdust and shavings.

Table 28.—*Projections of net annual growth, available cut and inventory of sawtimber and growing stock on commercial forest land, by softwood and hardwood, South Carolina, 1967 to 1997* [1]

Species group	1967 (Inventory year)	Projections		
		1977 (Inventory year plus 10 years)	1987 (Inventory year plus 20 years)	1997 (Inventory year plus 30 years)
	GROWING STOCK (In thousand cubic feet)			
Softwood:				
Cut	287,700	397,800	479,300	537,800
Growth	412,400	480,100	523,800	544,900
Inventory [2]	6,105,800	7,100,600	7,715,900	7,955,100
Hardwood:				
Cut	154,000	218,100	252,500	278,900
Growth	242,100	263,400	276,800	282,400
Inventory [2]	6,145,100	6,696,100	7,032,900	7,161,100
Total:				
Cut	441,700	615,900	731,800	816,700
Growth	654,500	743,500	800,600	827,300
Inventory [2]	12,250,900	13,796,700	14,748,800	15,116,200
	SAWTIMBER (In thousand board feet)			
Softwood:				
Cut	979,200	1,353,000	1,620,000	1,800,000
Growth	1,397,700	1,601,000	1,732,000	1,792,000
Inventory [2]	19,467,200	22,706,000	24,411,000	24,871,000
Hardwood:				
Cut	498,500	541,000	626,000	689,000
Growth	695,600	657,000	682,000	691,000
Inventory [2]	15,548,400	17,024,000	17,848,000	18,103,000
Total:				
Cut	1,477,700	1,894,000	2,246,000	2,489,000
Growth	2,093,300	2,258,000	2,414,000	2,483,000
Inventory [2]	35,015,600	39,730,000	42,259,000	42,974,000

[1] Based on the assumption that cut starting at the 1967 level will be in balance with the growth by the year 2000, and that forestry progress will continue at the rate indicated by recent trends.
[2] Inventory as of January 1 of the following year.

Table 29.—*Basal area per acre of growing stock and rough and rotten trees 5.0 inches d.b.h. and larger, by forest type and Survey Unit, South Carolina, 1968*

Forest type	State	Southern Coastal Plain	Northern Coastal Plain	Piedmont
	Square feet			
White pine-hemlock:				
Growing stock	60.1	.	.	60.1
Rough and rotten trees	15.0	.	.	15.0
All trees	75.1	.	.	75.1
Longleaf-slash pine:				
Growing stock	33.7	31.5	36.1	.
Rough and rotten trees	2.4	2.5	2.4	.
All trees	36.1	34.0	38.5	.
Loblolly-shortleaf pine:				
Growing stock	47.6	45.5	52.9	42.7
Rough and rotten trees	6.1	5.5	6.2	6.3
All trees	53.7	51.0	59.1	49.0
Oak-pine:				
Growing stock	39.2	36.8	40.0	39.8
Rough and rotten trees	9.4	7.9	9.3	11.0
All trees	48.6	44.7	49.3	50.8
Oak-hickory:				
Growing stock	35.5	23.8	37.2	42.1
Rough and rotten trees	13.0	10.9	13.8	13.5
All trees	48.5	34.7	51.0	55.6
Oak-gum-cypress:				
Growing stock	66.6	63.4	68.7	.
Rough and rotten trees	27.7	23.8	30.3	.
All trees	94.3	87.2	99.0	.
Elm-ash-cottonwood:				
Growing stock	59.0	74.6	59.5	44.9
Rough and rotten trees	24.2	25.3	26.5	19.8
All trees	83.2	99.9	86.0	64.7
All types:				
Growing stock	45.7	42.6	49.4	42.1
Rough and rotten trees	11.7	11.2	13.3	9.4
All trees	57.4	53.8	62.7	51.5

Table 30.—*Number of growing stock and rough and rotten trees 1.0-4.9 inches d.b.h. per acre, by forest type and Survey Unit, South Carolina, 1968*

Forest type	State	Southern Coastal Plain	Northern Coastal Plain	Piedmont
	Number of trees			
White pine-hemlock:				
Growing stock	93			93
Rough and rotten trees	201			201
All trees	294	.		294
Longleaf-slash pine:				
Growing stock	266	283	242	
Rough and rotten trees	137	145	127	
All trees	403	428	369	
Loblolly-shortleaf pine:				
Growing stock	416	314	384	463
Rough and rotten trees	245	237	288	222
All trees	661	551	672	685
Oak-pine:				
Growing stock	271	204	280	306
Rough and rotten trees	398	338	439	395
All trees	669	542	719	701
Oak-hickory:				
Growing stock	216	177	211	241
Rough and rotten trees	460	512	493	407
All trees	676	689	704	648
Oak-gum-cypress:				
Growing stock	219	237	204	
Rough and rotten trees	518	506	527	
All trees	737	743	731	
Elm-ash-cottonwood:				
Growing stock	128	172	74	146
Rough and rotten trees	382	352	445	348
All trees	510	524	519	494
All types:				
Growing stock	300	244	273	369
Rough and rotten trees	351	354	393	304
All trees	651	598	666	673

Table 31.—*Area of commercial forest land, by stand volume (board feet) and ownership classes, by physiographic classes, South Carolina, 1968*

Ownership class and stand volume per acre [1]	All classes	Physiographic class								
		Deep swamps	Broad stream margins	Narrow stream margins	Mountain tops and slopes	Flatwoods and dry pocosins	Bays and wet pocosins	Rolling uplands	Sandhills	Other misc. classes
	Thousand acres									
National Forest:										
Less than 1,500 bd. ft.	71.3	.	.	3.1	.	31.0	12.4	24.8	.	.
1,500 to 5,000 bd. ft.	208.2	3.4		6.8	30.7	92.2	10.2	64.9	.	.
More than 5,000 bd. ft.	271.4	17.0	3.4	27.1	3.4	95.0	27.1	95.0	.	3.4
All classes	550.9	20.4	3.4	37.0	34.1	218.2	49.7	184.7	.	3.4
Other public:										
Less than 1,500 bd. ft.	262.2	2.5	2.5	5.0	.	40.0	5.0	49.9	152.3	5.0
1,500 to 5,000 bd. ft.	151.6	10.8	2.7	19.0	5.4	35.2	2.7	43.3	27.1	5.4
More than 5,000 bd. ft.	108.5	.	13.6	16.3	2.7	10.9	10.8	27.1	16.3	10.8
All classes	522.3	13.3	18.8	40.3	8.1	86.1	18.5	120.3	195.7	21.2
Forest industry:										
Less than 1,500 bd. ft.	927.4	16.8	7.2	28.8	.	439.7	69.6	274.0	74.5	16.8
1,500 to 5,000 bd. ft.	573.3	30.9	21.4	42.8	2.4	309.2	38.1	114.2	9.5	4.8
More than 5,000 bd. ft.	546.7	114.1	61.0	34.5	.	252.1	18.6	50.4	2.7	13.3
All classes	2,047.4	161.8	89.6	106.1	2.4	1,001.0	126.3	438.6	86.7	34.9
Farmer and misc. private:										
Less than 1,500 bd. ft.	4,786.0	6.2	32.1	285.7	22.5	1,384.6	136.4	2,019.7	790.6	108.2
1,500 to 5,000 bd. ft.	2,931.8	101.4	95.3	368.5	73.6	1,197.3	92.1	850.2	113.5	39.9
More than 5,000 bd. ft.	1,572.3	171.1	137.9	317.3	11.0	595.7	52.4	217.9	30.3	38.7
All classes	9,290.1	278.7	265.3	971.5	107.1	3,177.6	280.9	3,087.8	934.4	186.8
All ownerships:										
Less than 1,500 bd. ft.	6,046.9	25.5	41.8	322.6	22.5	1,895.3	223.4	2,368.4	1,017.4	130.0
1,500 to 5,000 bd. ft.	3,864.9	146.5	119.4	437.1	112.1	1,633.9	143.1	1,072.6	150.1	50.1
More than 5,000 bd. ft.	2,498.9	302.2	215.9	395.2	17.1	953.7	108.9	390.4	49.3	66.2
All classes	12,410.7	474.2	377.1	1,154.9	151.7	4,482.9	475.4	3,831.4	1,216.8	246.3

[1] Sawtimber volume, International ¼-inch rule.

Table 32.—*Area of commercial forest land, by stand volume (cubic feet) and ownership classes, by physiographic classes, South Carolina, 1968*

Ownership class and stand volume per acre [1]	All classes	Physiographic class								
		Deep swamps	Broad stream margins	Narrow stream margins	Mountain tops and slopes	Flatwoods and dry pocosins	Bays and wet pocosins	Rolling uplands	Sandhills	Other misc. classes
	Thousand acres									
National Forest:										
Less than 500 cu. ft.	53.6	.	..	.	.	30.2	13.3	10.1	.	.
500 to 1,000 cu. ft.	117.6	.	.	6.7	13.6	53.7	3.3	40.3	.	..
More than 1,000 cu. ft.	379.7	20.4	3.4	30.3	20.5	134.3	33.1	134.3	.	3.4
All classes	550.9	20.4	3.4	37.0	34.1	218.2	49.7	184.7	.	3.4
Other public:										
Less than 500 cu. ft.	236.4	.	2.7	2.7	.	28.7	5.3	44.4	149.9	2.7
500 to 1,000 cu. ft.	106.9	5.3	.	13.4	.	31.3	2.6	28.8	22.9	2.6
More than 1,000 cu. ft.	179.0	8.0	16.1	24.2	8.1	26.1	10.6	47.1	22.9	15.9
All classes	522.3	13.3	18.8	40.3	8.1	86.1	18 5	120.3	195.7	21.2
Forest industry:										
Less than 500 cu. ft.	764.2	7.7	7.7	22.2	.	360.7	63.1	220.5	72.3	10.0
500 to 1,000 cu. ft.	401.8	10.3	7.7	17.3	.	230.6	24.3	96.9	7.2	7.5
More than 1,000 cu. ft.	881.4	143.8	74.2	66.6	2.4	409.7	38.9	121.2	7.2	17.4
All classes	2,047.4	161.8	89.6	106.1	2.4	1,001.0	126.3	438.6	86.7	34.9
Farmer and misc. private:										
Less than 500 cu. ft.	3,754.3	.	20.4	176.3	12.3	1,113.1	125.2	1,466.1	761.3	79.6
500 to 1,000 cu. ft.	2,133.6	20.1	35.0	179.4	27.5	844.6	48.8	846.7	107.0	24.5
More than 1,000 cu. ft.	3,402.2	258.6	209.9	615.8	67.3	1,219.9	106.9	775.0	66.1	82.7
All classes	9,290.1	278.7	265.3	971.5	107.1	3,177.6	280.9	3,087.8	934.4	186.8
All ownerships:										
Less than 500 cu. ft.	4,808.5	7.7	30.8	201.2	12.3	1,532.7	206.9	1,741.1	983.5	92.3
500 to 1,000 cu. ft.	2,759.9	35.7	42.7	216.8	41.1	1,160.2	79.0	1,012.7	137.1	34.6
More than 1,000 cu. ft.	4,842.3	430.8	303.6	736.9	98.3	1,790.0	189.5	1,077.6	96.2	119.4
All classes	12,410.7	474.2	377.1	1,154.9	151.7	4,482.9	475.4	3,831.4	1,216.8	246.3

[1] Growing-stock volume.

Table 33.—*Average net volume and growth per acre on commercial forest land, by physiographic class, tree class, and species group, South Carolina, 1968*

Physiographic class and tree class	Net volume per acre						Net growth per acre					
	Softwood		Hardwood		Total		Softwood		Hardwood		Total	
	Cubic feet	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*	*Cubic feet*	*Board feet*
Deep swamps:												
Growing stock	461.0	1,769	2,054.6	5,679	2,515.6	7,448	12.8	62	61.9	198	74.7	260
Rough and rotten trees	47.7		644.9		692.6		0.6		14.0		14.6	
Total	508.7	1,769	2,699.5	5,679	3,208.2	7,448	13.4	62	75.9	198	89.3	260
Broad stream margins:												
Growing stock	251.3	1,013	1,952.8	6,208	2,204.1	7,221	9.2	44	61.9	223	71.1	267
Rough and rotten trees	8.9		495.4		504.3		0.2		11.4		11.6	
Total	260.2	1,013	2,448.2	6,208	2,708.4	7,221	9.4	44	73.3	223	82.7	267
Narrow stream margins:												
Growing stock	319.3	1,180	1,243.5	3,325	1,562.8	4,505	13.8	57	43.8	142	57.6	199
Rough and rotten trees	10.9		383.5		394.4		0.5		10.2		10.7	
Total	330.2	1,180	1,627.0	3,325	1,957.2	4,505	14.3	57	54.0	142	68.3	199
Mountain tops and slopes:												
Growing stock	463.2	1,450	741.6	1,713	1,204.8	3,163	25.9	86	30.2	83	56.1	169
Rough and rotten trees	14.7		221.1		235.8		5.0		6.2		11.2	
Total	477.9	1,450	962.7	1,713	1,440.6	3,163	30.9	86	36.4	83	67.3	169
Flatwoods and dry pocosins:												
Growing stock	659.9	2,298	353.0	862	1,012.9	3,160	44.5	167	15.8	45	60.3	212
Rough and rotten trees	18.9		118.0		136.9		1.5		3.5		5.0	
Total	678.8	2,298	471.0	862	1,149.8	3,160	46.0	167	19.3	45	65.3	212
Bays and wet pocosins:												
Growing stock	505.8	1,775	515.8	1,277	1,021.6	3,052	29.3	107	16.5	49	45.8	156
Rough and rotten trees	23.5		184.7		208.2		1.3		4.7		6.0	
Total	529.3	1,775	700.5	1,277	1,229.8	3,052	30.6	107	21.2	49	51.8	156
Rolling uplands:												
Growing stock	476.4	1,310	269.4	572	745.8	1,882	36.7	110	13.3	32	50.0	142
Rough and rotten trees	17.4		84.1		101.5		1.8		2.9		4.7	
Total	493.8	1,310	353.5	572	847.3	1,882	38.5	110	16.2	32	54.7	142
Sandhills:												
Growing stock	278.8	811	38.1	69	316.9	880	25.1	79	2.2	4	27.3	83
Rough and rotten trees	8.7		43.8		52.5		0.9		1.1		2.0	
Total	287.5	811	81.9	69	369.4	880	26.0	79	3.3	4	29.3	83
Other misc. classes:												
Growing stock	442.2	1,550	776.3	1,888	1,218.5	3,438	16.7	54	27.8	82	44.5	136
Rough and rotten trees	17.1		252.4		269.5		0.9		7.1		8.0	
Total	459.3	1,550	1,028.7	1,888	1,488.0	3,438	17.6	54	34.9	82	52.5	136
All classes:												
Growing stock	502.4	1,645	519.0	1,338	1,021.4	2,983	33.7	117	20.1	59	53.8	176
Rough and rotten trees	17.7		165.1		182.8		1.4		4.5		5.9	
Total	520.1	1,645	684.1	1,338	1,204.2	2,983	35.1	117	24.6	59	59.7	176

Table 34.—*Land area, by class, major forest type, and survey completion date, 1947, 1958, and 1968*

Land use class	Survey completion date			Change 1958-1968
	1947	1958	1968	
	Thousand acres			
Forest land:				
Commercial forest land:				
Pine and oak-pine types	7,324.1	6,683.6	7,649.1	+965.5
Hardwood types	4,575.4	5,251.3	4,761.6	−489.7
Total	11,899.5	11,934.9	12,410.7	+475.8
Noncommercial forest land:				
Productive-reserved	40.2	73.9	70.3	− 3.6
Unproductive	2.9	7.0	12.6	+ 5.6
Total	43.1	80.9	82.9	+ 2.0
Nonforest land	7,385.4	7,206.2	6,680.7	−525.5
All land [1]	19,328.0	19,222.0	19,174.3	− 47.7

[1] Excludes all water areas.

Table 35.—*Volume [1] of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date, South Carolina, 1947, 1958, and 1968*

Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
SAWTIMBER (In million board feet, International ¼-inch rule)											
Softwood	1947	17,175.7	.	.	3,085.0	3,537.1	3,412.1	2,639.8	1,703.8	1,024.7	1,773.2
	1958	15,485.4	.	.	3,191.3	3,433.8	2,905.6	2,345.8	1,553.9	871.0	1,184.0
	1968	19,467.2	.	.	3,698.1	4,257.1	3,889.2	2,931.9	1,894.9	1,213.8	1,582.2
Hardwood	1947	15,814.2	.	.	.	2,501.5	3,102.3	2,717.2	2,343.7	1,531.8	3,617.7
	1958	13,893.9	.	.	.	2,515.2	2,957.6	2,516.2	1,938.4	1,360.5	2,606.0
	1968	15,548.4	.	.	.	2,769.9	3,218.1	2,810.8	2,259.0	1,489.3	3,001.3
GROWING STOCK (In million cubic feet)											
Softwood	1947	5,147.4	433.6	671.3	840.8	854.6	778.7	586.2	371.8	224.0	386.4
	1958	4,889.3	481.2	734.1	869.4	829.8	664.7	521.8	339.1	190.9	258.3
	1968	6,105.8	632.5	870.7	1,007.6	1,029.4	889.7	651.9	413.6	265.7	344.7
Hardwood	1947	5,737.6	308.9	471.2	670.4	817.1	863.3	707.5	599.2	386.0	914.0
	1958	5,411.4	352.4	540.9	716.4	821.3	823.1	656.0	497.7	343.8	659.8
	1968	6,145.1	422.2	660.2	811.5	904.8	896.3	733.1	579.7	377.4	759.9
ALL LIVE TIMBER (In million cubic feet)											
Softwood	1947	5,323.6	476.9	718.5	874.6	869.2	784.6	588.6	374.3	226.1	410.8
	1958	5,065.8	529.7	785.8	904.4	843.9	669.8	523.9	341.4	192.7	274.2
	1968	6,325.0	696.2	932.1	1,048.2	1,046.6	896.4	654.7	416.2	268.1	366.5
Hardwood	1947	7,492.2	524.4	699.3	918.8	1,053.4	1,047.0	841.4	711.4	469.3	1,227.2
	1958	7,107.2	598.3	801.4	980.5	1,055.7	997.7	778.9	589.6	417.8	887.3
	1968	8,093.1	717.9	976.6	1,110.5	1,163.9	1,086.3	870.0	686.9	458.2	1,022.8

[1] In order to provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in previous surveys.

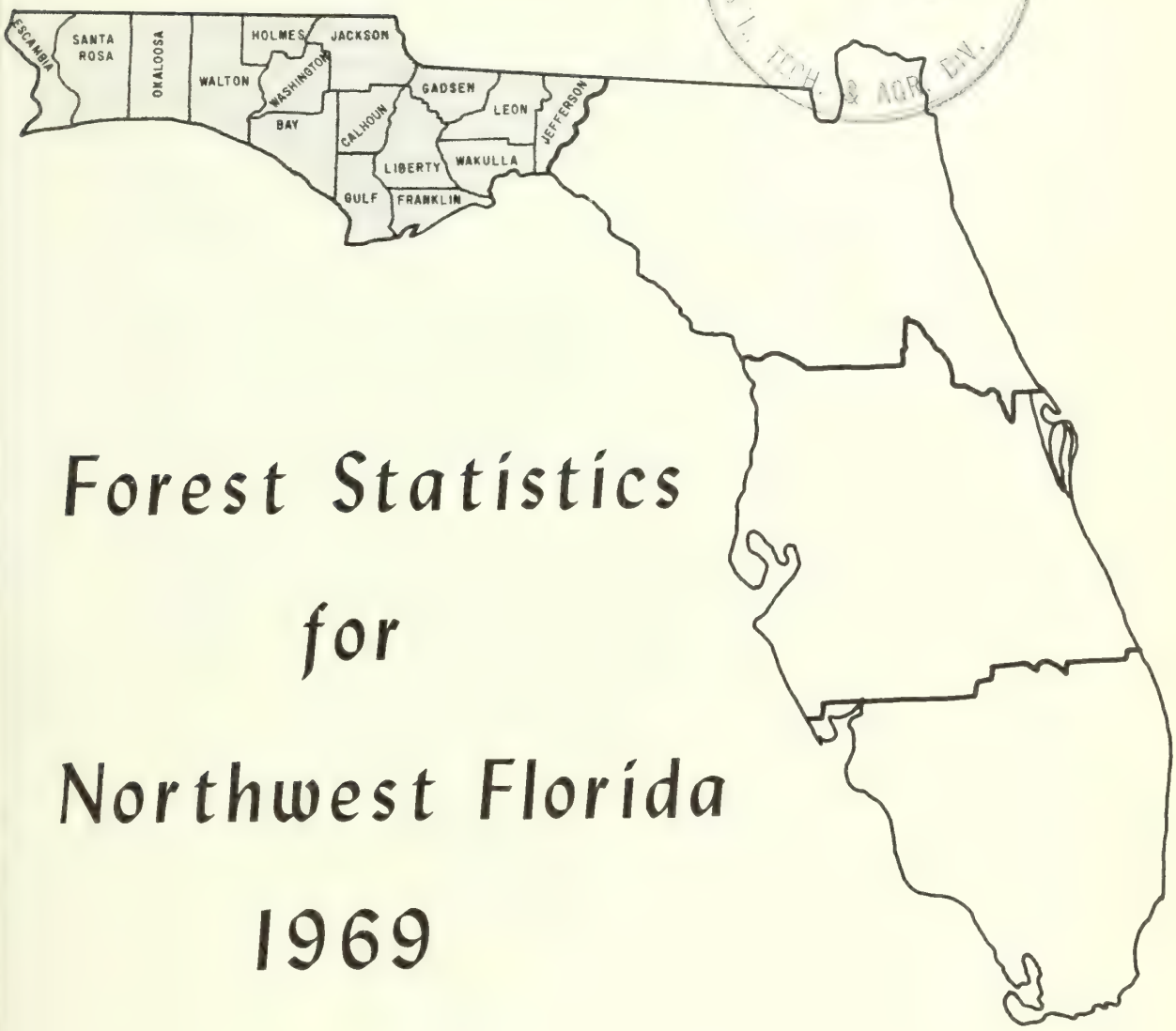
Table 36.—*Volume of all live timber, by species group and Survey Unit, South Carolina, 1947, 1958, and 1968*

Species group and Survey Unit	1947	1958	Change 1947-1958	1968	Change 1958-1968
	Million cu. ft.	*Million cu. ft.*	*Percent*	*Million cu. ft.*	*Percent*
Softwood:					
Southern Coastal Plain	1,281.9	1,213.6	− 5.3	1,568.5	+29.2
Northern Coastal Plain	2,333.5	2,166.7	− 7.1	2,689.9	+24.1
Piedmont	1,708.2	1,685.5	− 1.3	2,066.6	+22.6
All units	5,323.6	5,065.8	− 4.8	6,325.0	+24.9
Hardwood:					
Southern Coastal Plain	2,036.2	2,089.6	+ 2.6	2,315.4	+10.8
Northern coastal Plain	3,833.1	3,212.1	−16.2	3,626.8	+12.9
Piedmont	1,622.9	1,805.5	+11.3	2,150.9	+19.1
All units	7,492.2	7,107.2	− 5.1	8,093.1	+13.9

NATIONAL FOREST SYSTEM
COOPERATIVE FORESTRY
FORESTRY RESEARCH
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

U.S.D.A. Forest Service Resource Bulletin SE-14 June 1969

LOUISIANA UNIVERSITY LIBRARY
JUL 9 1969
S.L. TECH. & AGR. DIV.



Forest Statistics for Northwest Florida 1969

Forest Service - U.S. Department of Agriculture
Southeastern Forest Experiment Station
Asheville, North Carolina

FOREWORD

This report highlights the principal findings of the fourth Forest Survey of the timber resource in Northwest Florida. The survey was started in July 1968 and completed in March 1969. Findings of the three previous surveys, completed in 1934, 1949, and 1959, provide the basis for measuring changes that have occurred and trends that have developed over the past 35 years. However, in this report, the primary emphasis is on the changes and trends that have taken place since the last survey.

Forest Survey, authorized by the McSweeney-McNary Forest Research Act of May 22, 1928, is a continuing nationwide undertaking by the regional experiment stations of the Forest Service, U.S.D.A. In Florida, Georgia, North Carolina, South Carolina, and Virginia, Forest Survey is an activity of the Southeastern Forest Experiment Station, with headquarters at Asheville, North Carolina. The general objective is to inventory periodically the forest lands, their extent, condition, and volume of timber, and to ascertain rates of forest growth and depletion. It is necessary to keep this basic information up to date to provide a sound basis for the formulation of forest policies and programs.

The 16-county area covered by this report is one of four Survey units in Florida. Comparable reports for the other three units will be issued as the Statewide survey progresses. When completed, this survey will provide updated statistics on the timber resource for all of Florida.

The Southeastern Station gratefully acknowledges the cooperation and assistance provided by the Florida Forest Service in the collection of the field data.

Joe P. McClure, Project Leader of the Forest Survey in the Southeast, organized and coordinated the various phases of the Survey. Noel D. Cost was in charge of the data collection. William H. B. Haines was in charge of the computations. Richard L. Welch was responsible for compiling the timber removal and mortality information. Herbert A. Knight was in charge of the analysis and reporting.

Office personnel assisting in this report were:

Robert A. Cathey
Gerald C. Craver
Bertie W. Greene
Cecil C. Hutchins, Jr.
Joanne Hutchison
Doniev W. Jackson
Ruth E. McIntyre
Agnes C. Nichols
Louise Shuford
Sammy S. Wenningham
Dorothy S. White
Camilla E. Young

The field party included:

John D. Nesbit, Field Supervisor
Thomas R. Bellamy, Field Assistant

Jacky D. Balkcom
Edgar L. Davenport
Jeffrey E. Dukes
Leonard G. Edwards
Robert S. Hensley
Roy C. Henson
Harold D. Mathews
Bruce E. Mullin
John F. Parlier, Jr.
Douglas R. Phillips
Nolan L. Snyder
Harry J. Van Loock III
Richard J. White, Jr.

Forest Statistics for Northwest Florida 1969

by
Herbert A. Knight, Associate Resource Analyst

CONTENTS

Page

HIGHLIGHTS - 1

HOW THE FOREST SURVEY IS MADE - - - - - - - - - - - - - - - - - - - 3

RELIABILITY OF THE DATA - 4

DEFINITIONS OF TERMS - 6

COUNTY TABLES:

1. Area, by land class - 13
2. Area of commercial forest land, by ownership class - - - - - - 14
3. Area of commercial forest land, by forest-type group - - - - - 15
4. Area of commercial forest land, by stand-size class - - - - - 16
5. Area of commercial forest land, by site class - - - - - - - - 17
6. Area of commercial forest land, by stocking classes of growing-stock trees - 18
7. Volume of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - - - - - - - - 19
8. Net annual growth of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - - - 20
9. Annual removals of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - - - - - 21

UNIT TABLES:

10. Area of commercial forest land, by forest type and ownership class - 22
11. Area of commercial forest land, by ownership and stocking classes of growing-stock trees - - - - - - - - - - - - - - - - 22
12. Volume of timber on commercial forest land, by class and species group - 23
13. Number of growing-stock trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - - 24
14. Volume of all live trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - - - 25
15. Volume of growing stock on commercial forest land, by species and diameter class - 26
16. Volume of sawtimber on commercial forest land, by species and diameter class - 27
17. Net annual growth and removals of growing stock on commercial forest land, by species - - - - - - - - - - - - - - - - - 28
18. Net annual growth and removals of sawtimber on commercial forest land, by species - - - - - - - - - - - - - - - - - - - 29
19. Mortality of growing stock and sawtimber on commercial forest land, by species - 30
20. Volume of all live trees and growing stock on commercial forest land, by ownership class and species group - - - - - - 31
21. Volume of sawtimber on commercial forest land, by ownership class and species group - - - - - - - - - - - - - - - - - - 31
22. Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group - - - 32
23. Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group - - - - - 32
24. Average net volume per acre of sawtimber, growing stock, and other live timber on commercial forest land, by ownership class, major forest type, and species group - - - - - - - - 33
25. Land area, by class, major forest type, and survey completion date - 34
26. Volume of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date - - - - - - - - - - - - - - - - - 35

HIGHLIGHTS

Since 1959 in Northwest Florida--

--no significant change has occurred in the total area of commercial forest land. Commercial forests still occupy 5.7 million acres, or about 79 percent, of the total land in this 16-county area. The reversion of some 320,000 acres of former agricultural land to forest just about offset the loss of commercial forests to other land uses. Forestry activity, however, has changed the timber scene over the past 10 years, as shown below.

--over one-half million acres have been artificially reforested. In fact, about one out of every six acres of commercial forest now shows evidence of artificial reforestation if all plantings are included regardless of age. Most of the planting has been slash pine. The slash pine forest type has increased by 34 percent, and is now the leading type with 1.7 million acres. Extensive areas formerly occupied by scrub oaks have been converted to pine. The scrub oak forest type has been reduced about 300,000 acres, or by over one-third.

--nonstocked forest land has been reduced by half, from 1.4 to 0.7 million acres. Average stand density of all live trees 5.0 inches d.b.h. and larger is now 41 square feet per acre, compared to 36 square feet in 1959 and 30 square feet in 1949. In spite of the buildup in average stand density, one out of every two acres is still either nonstocked or poorly stocked.

--little change has occurred in the forest ownership pattern except for a 9-percent reduction in the amount of farm woodland. Apparently, about 96,000 acres of farm woodland were either cleared or shifted into forest industry or other private ownership. About 4.5 million acres, or over 78 percent, of the commercial forest lands are privately owned, and forest industry owns about 2.0 million acres of this total. Practically all of the publicly owned forest land is in three holdings: Apalachicola National Forest, Eglin Air Force Base, and the Blackwater River State Forest.

--volume of softwood growing stock has increased by 470 million cubic feet, or almost 28 percent. This means that the rate of increase between the two previous surveys has been sustained. All of the softwood species showed gains in volume, but slash pine accounted for 56 percent of the softwood increase and is now almost equal to longleaf pine in terms of inventory volume. Cypress made the smallest gain. Volume of softwood sawtimber has increased by one-third, from 4.8 to almost 6.5 billion board feet.

--volume of hardwood growing stock has increased by 130 million cubic feet, or less than 10 percent. This was double the rate of increase between the two previous surveys. Tupelo and blackgum accounted for half of the hardwood increase. Hickory was the only hardwood species that showed a significant reduction in volume. Volume of hardwood sawtimber increased 13 percent, from 3.3 to 3.7 billion board feet.

In 1968--

--net growth of growing stock exceeded removals by an estimated 59 million cubic feet, or 56 percent. Over 70 percent of this growth over removals was pine. By ownership, 47 percent of the growth over removals was on public lands, 19 percent on forest-industry lands, and the remaining 34 percent on farmer-owned and other private lands.

--net growth of sawtimber exceeded removals by an estimated 214 million board feet, or 61 percent. Here again, over 70 percent of this growth over removals was pine. By ownership, 52 percent of the growth over removals was on public lands, 16 percent on forest industry lands, and the remaining 32 percent on farmer-owned and other private lands.

--removals of growing stock totaled 105 million cubic feet, which was roughly double the volume of removals in 1958. About 43 percent of all timber removals occurred on forest-industry lands, although these lands comprise only one-third of the commercial forests. Pulpwood is the leading product removed in terms of volume, and yearly reports also show that the annual pulpwood harvest has doubled in Northwest Florida over the past 10 years.

--mortality of growing stock totaled over 15 million cubic feet, which was well below the estimate of mortality in 1958. It was still enough mortality to reduce gross growth by about 8 percent. Windthrow, lightning, and scattered incidents of pine bark beetles were the leading identifiable causes of death; however, fire, disease, and suppression have also taken their toll.

HOW THE FOREST SURVEY IS MADE

The method of survey is essentially a sampling procedure designed to provide reliable statistics primarily at the State and Survey Unit levels. Individual county statistics are presented to permit adding any combination of counties together until the total is large enough to meet the desired degree of reliability. The basic steps of the survey procedure were as follows:

1. In 14 of the 16 counties, initial estimates of forest and nonforest areas were based on the classification of 23,680 sample clusters systematically spaced on the latest aerial photographs available. A subsample of 2,318 of these 16-point clusters were ground checked, and a linear regression was fitted to the data to develop the relationship between the photo and ground classification of the subsample. This procedure provided a means for adjusting the initial estimates of area for change in land use since date of photography and for photo misclassifications.

2. In 2 of the 16 counties, aerial photography available was considered to be outdated. Estimates of forest and nonforest areas were determined by direct aerial observation of 9,381 sample points from fixed-wing aircraft along flight lines 2 miles apart. An interval timer was used to determine the sample points.

3. Estimates of timber volume and forest classifications were based on measurements recorded at 1,713 ground sample locations systematically distributed within the commercial forest land. A 10-point cluster of plots systematically spaced on an acre were measured at each of these sample locations using a basal area factor of 37.5 square feet per acre. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

4. Equations prepared from detailed measurements collected on the trees tallied at 1 out of every 20 sample locations were used to compute the volumes of individual tally trees. A mirror caliper and sectional aluminum poles were used to obtain the additional measurements on standing trees required to construct the volume equations. The same 5-percent subsample of plots used for the tree-volume study also served as a quality control of field measurements. Felled trees were measured at active cutting operations to provide utilization factors for product and species groups and to supplement the standing tree-volume study.

5. Estimates of growth, removals, and mortality were determined from the remeasurement of 1,268 permanent sample plots which were established in the third survey.

6. Ownership information was collected from local contacts, correspondence, and public records. In those counties where the sample missed a particular ownership class, temporary sample plots were added and measured to describe the forest conditions within the ownership class.

7. All field data were sent to Asheville for editing and were punched in cards and stored on magnetic tape for machine computing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

RELIABILITY OF THE DATA

Statistical analysis of these data indicates the following sampling errors:

	Percent
Per million acres of commercial forest land	1.12
Per billion cubic feet of growing stock	5.39
Per billion cubic feet of net annual growth	1.06
Per billion cubic feet of annual removals	2.66

Sampling errors for county and unit totals,[1/] in terms of one standard error

County	Commercial forest area	Cubic-foot volume of growing stock		
		Inventory	Growth	Removals
	Sampling error[2/]			
Bay	1.65	14.42	13.11	28.75
Calhoun	1.32	12.68	13.36	32.69
Escambia	2.63	11.42	9.54	24.76
Franklin	2.29	15.11	12.85	35.31
Gadsden	2.75	11.01	10.34	38.75
Gulf	1.30	14.32	11.92	45.73
Holmes	3.15	14.05	12.65	36.57
Jackson	1.82	10.33	11.37	26.05
Jefferson	1.56	9.60	9.97	30.54
Leon	2.45	9.30	8.45	30.71
Liberty	0.64	8.69	8.07	25.30
Okaloosa	1.00	10.38	9.65	33.96
Santa Rosa	1.96	9.16	8.12	26.41
Wakulla	0.89	8.03	7.87	47.34
Walton	2.06	9.74	8.99	26.97
Washington	1.95	13.81	16.61	34.03
Unit total	0.47	2.83	2.62	8.22

1/ Sampling error of breakdowns of county and unit totals may be computed with the following formula:

$$e = \frac{(SE)\ \sqrt{(\text{Specified volume or area})}}{\sqrt{(\text{Volume or area total in question})}}$$

Where: e = Sampling error of the volume or area total in question.
SE = Specified sampling error in table.

2/ By random-sampling formula (in percent).

DEFINITIONS OF TERMS

Acceptable trees.--Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.

Basal area.--The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand, usually expressed as square feet of basal area per acre.

Commercial forest land.--Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

Commercial species.--Tree species presently or prospectively suitable for industrial wood products.

Cropland.--Land under cultivation within the past 24 months, including orchards and land in soil-improving crops, but excluding land cultivated in developing improved pasture. Also includes idle farmland.

Desirable trees.--Growing-stock trees of commercial species having no serious defects in quality limiting present or prospective use for timber products, of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age.

Diameter class.--A classification of trees based on diameter outside bark, measured at breast height ($4\frac{1}{2}$ feet above the ground). D.b.h. is the common abbreviation for "diameter at breast height." Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h., inclusive.

Farm.--Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totaled $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for the year amounted to at least $250.

Farm operator.--A person who operates a farm, either doing the work himself or directly supervising the work.

Farmer-owned lands.--Lands owned by farm operators.

Forest industry lands.--Lands owned by companies or individuals operating wood-using plants.

Forest land.--Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest type.--A classification of forest land based upon the species forming a plurality of live-tree stocking.

Longleaf-slash pine.--Forests in which longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Loblolly-shortleaf pine.--Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Oak-pine.--Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.--Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress.--Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprises a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood.--Forests in which elm, ash, or cottonwood, singly or in combination, comprises a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Gross growth.--Annual increase in net volume of trees in the absence of cutting and mortality.

Growing-stock trees.--Live trees of commercial species qualifying as desirable or acceptable trees.

Growing-stock volume.--Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. (Net volume in primary forks is included.)

Hardwoods.--Dicotyledonous trees, usually broad-leaved and deciduous.

Soft hardwoods.--Soft-textured hardwoods such as boxelder, red and silver maple, buckeye, hackberry, loblolly-bay, silverbell (in mts.), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm.

Hard hardwoods.--Hard-textured hardwoods such as Florida and sugar maple, birch, hickory, dogwood, persimmon (forest grown), beech, ash, honeylocust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Idle farmland.--Includes former croplands, orchards, improved pastures and farm sites not tended within the past two years, and presently less than 16.7 percent stocked with trees.

Improved pasture.--Land currently improved for grazing by cultivation, seeding, irrigation, or clearing of trees or brush.

Industrial wood.--All roundwood products except fuelwood.

Land area.--The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area.

Logging residues.--The unused portions of trees cut or killed by logging.

Miscellaneous Federal lands.--Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

Miscellaneous private lands - corporate.--Lands owned by private corporations other than forest industry.

Miscellaneous private lands - individual.--Privately owned lands other than forest-industry, farmer-owned, or corporate lands.

Mortality.--Number or sound-wood volume of live trees dying from natural causes during a specified period.

National Forest land.--Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Net annual growth.--The increase in volume for a specific year.

Net volume.--Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial forest land.--(a) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and (b) productive-reserved forest land.

Noncommercial species.--Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land.--Land that has never supported forests and lands formerly forested where timber management is precluded by development for other uses.

Nonstocked land.--Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Other Federal lands.--Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

Other public lands.--Publicly-owned lands other than National Forests.

Overstocked areas.--Areas where growth of trees is significantly reduced by excessive numbers of trees.

Poletimber trees.--Growing-stock trees of commercial species at least 5.0 inches in d.b.h. but smaller than sawtimber size.

Productive-reserved forest land.--Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation.

Rangeland.--Land on which the natural plant cover is composed principally of native grasses, forbs, or shrubs valuable for forage.

Rotten trees.--Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively, primarily because of rot or missing sections, and with less than one-third of the gross tree volume in sound material.

Rough trees.--(a) Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively, primarily because of roughness, poor form, splits, and cracks, and with less than one-third of the gross tree volume in sound material, and (b) all live trees of noncommercial species.

Salvable dead trees.--Standing or down dead trees that are considered merchantable by Forest Survey standards.

Saplings.--Live trees 1.0 inch to 5.0 inches in diameter at breast height.

Saw log.--A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, and with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods).

Saw-log portion.--That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.--The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber trees.--Live trees of commercial species containing at least a 12-foot saw log and with at least one-third of the gross board-foot volume between the 1-foot stump and minimum saw-log top sound. Softwoods must be at least 9.0 inches and hardwoods at least 11.0 inches in diameter at breast height.

Sawtimber volume.--Net volume of the saw-log portion of live sawtimber in board-foot International 1/4-inch rule.

Seedlings.--Live trees less than 1.0 inch in diameter at breast height that are expected to survive and develop.

Site class.--A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Class 1.--Sites capable of producing 165 or more cubic feet per acre annually.

Class 2.--Sites capable of producing 120 to 165 cubic feet per acre annually.

Class 3.--Sites capable of producing 85 to 120 cubic feet per acre annually.

Class 4.--Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 5.--Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

Softwoods.--Coniferous trees, usually evergreen, having needles or scale-like leaves.

Pines.--Yellow pine species which include loblolly, longleaf, slash, shortleaf, pitch, Virginia, Table-Mt., sand, and spruce pine.

Other softwoods.--White pine, hemlock, cypress, eastern redcedar, white-cedar, spruce, and fir.

Stand-size class.--A classification of forest land based on the size class of growing-stock trees on the area.

Sawtimber stands.--Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.--Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.--Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and seedlings.

State, county, and municipal lands.--Lands owned by States, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Stocking.--The degree of occupancy of land by trees, measured by basal area or the number of trees in a stand and spacing in the stand, compared to a minimum standard, depending on tree size, to fully utilize the growth potential of the land. (See page 12.)

Timber removals.--The net volume of growing-stock trees removed from the inventory by harvesting; cultural operations, such as stand improvement; land clearing, or changes in land use.

Unproductive forest land.--Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

Upper-stem portion.--That part of the main stem or fork of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

Urban and other areas.--Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

Stocking standard

D.b.h. class	Minimum number of trees per acre for full stocking	Minimum basal area per acre for full stocking	Percent stocking assigned each tally tree[1/]
Seedlings	600	--	5.0
2	560	--	5.4
4	460	--	6.5
6	340	67	5.8
8	240	84	4.8
10	155	85	4.3
12	115	90	4.0
14	90	96	3.8
16	72	101	3.7
18	60	106	3.5
20	51	111	3.5

1/ Trees less than 5.0 inches d.b.h. were tallied on a 10-point cluster of circular, 1/300-acre plots at each sample location. Trees 5.0 inches d.b.h. and larger were tallied on a 10-point cluster of variable plots using a basal area factor of 37.5 at each sample location.

Overstocked--Over 130 percent
Fully stocked--100-130 percent
Medium stocked--60-99 percent
Poorly stocked--16.7-59 percent
Nonstocked--Less than 16.7 percent

Cubic feet of wood per average cord
(excluding bark)

D.b.h. class	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
6	61.2	61.0	68.2	60.0	60.0
8	68.8	68.1	76.0	68.4	68.4
10	73.7	73.0	81.4	73.4	73.4
12	77.1	76.6	85.3	76.4	76.4
14	79.9	79.4	88.2	78.4	78.4
16	81.5	81.6	90.4	79.8	79.8
18	83.0	83.3	92.3	80.8	80.8
20	83.3	84.7	93.8	81.6	81.6
22	83.5	86.0	95.1	82.1	82.1
24+	85.4	87.0	96.2	82.6	82.6
Average	73.8	72.1	82.8	74.3	74.7

Table 7.--Volume of sawtimber and growing stock on commercial forest land, by species group and county, 1969

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet[1/]				
Bay	250.6	208.6	14.3	25.6	2.1	113.8	92.6	6.3	12.3	2.6
Calhoun	326.7	155.5	28.2	92.2	50.8	139.8	72.8	10.2	38.2	18.6
Escambia	628.2	400.1	13.8	145.6	68.7	212.7	124.3	3.8	58.3	26.3
Franklin	491.3	186.7	108.4	175.3	20.9	195.1	83.3	41.5	63.2	7.1
Gadsden	607.2	280.3	3.1	211.3	112.5	199.3	72.1	0.7	80.8	45.7
Gulf	587.5	215.6	96.2	225.2	50.5	218.0	79.6	34.5	83.2	20.7
Holmes	277.9	137.1	11.9	91.4	37.5	121.8	56.3	5.0	44.9	15.6
Jackson	509.0	199.5	27.0	119.6	162.9	212.3	81.9	9.1	55.8	65.5
Jefferson	708.4	321.0	61.0	166.2	160.2	255.8	103.0	25.1	77.2	50.5
Leon	700.9	437.4	6.8	140.3	116.4	229.4	128.2	4.2	55.4	41.6
Liberty	1,464.5	590.5	291.7	367.1	215.2	458.3	190.5	73.8	135.5	58.5
Okaloosa	705.4	536.6	49.6	53.5	65.7	232.9	160.0	16.1	33.6	23.2
Santa Rosa	1,060.3	762.8	107.3	141.1	49.1	362.9	231.5	33.0	77.8	20.6
Wakulla	737.5	475.6	22.7	112.6	126.6	263.2	164.8	6.5	48.6	43.3
Walton	738.9	442.1	46.4	196.7	53.7	271.2	150.1	11.8	84.2	25.1
Washington	395.3	171.4	76.8	89.6	57.5	145.0	56.9	19.3	45.6	23.2
Total	10,189.6	5,520.8	965.2	2,353.3	1,350.3	3,631.5	1,847.9	300.9	994.6	488.1

1/ Factors for converting to cords are shown on page 12.

Table 8.--Net annual growth of sawtimber and growing stock on commercial forest land, by species group and county, 1968

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Bay	24.9	23.5	0.5	0.8	0.1	7.6	6.9	0.1	0.4	0.2
Calhoun	21.1	15.1	0.7	3.1	2.2	6.9	5.2	0.2	0.8	0.7
Escambia	34.2	27.2	0.2	4.4	2.4	10.9	8.7	0.1	1.2	0.9
Franklin	21.3	14.9	2.5	3.1	0.8	8.3	6.2	1.0	0.9	0.2
Gadsden	38.4	26.6	0.1	6.1	5.6	8.9	5.4	--	1.7	1.8
Gulf	25.0	16.8	2.1	4.6	1.5	7.3	4.9	0.7	1.2	0.5
Holmes	20.1	14.7	0.4	3.2	1.8	6.9	5.0	0.1	1.3	0.5
Jackson	24.9	15.3	0.5	3.0	6.1	10.8	7.1	0.1	1.0	2.6
Jefferson	32.3	21.1	0.8	5.3	5.1	10.3	6.6	0.3	1.7	1.7
Leon	38.9	29.8	0.3	3.9	4.9	9.6	6.9	0.1	1.2	1.4
Liberty	63.9	42.5	6.4	8.5	6.5	15.9	10.9	1.3	2.3	1.4
Okaloosa	43.1	36.8	1.9	1.4	3.0	10.5	8.4	0.5	0.8	0.8
Santa Rosa	62.2	52.4	3.0	4.5	2.3	17.7	14.2	0.8	2.0	0.7
Wakulla	43.0	34.2	0.5	3.1	5.2	11.7	9.1	0.1	1.0	1.5
Walton	49.5	39.2	0.9	5.9	3.5	14.8	11.6	0.2	2.0	1.0
Washington	20.5	14.4	1.1	2.9	2.1	6.0	3.9	0.3	0.8	1.0
Total	563.3	424.5	21.9	63.8	53.1	164.1	121.0	5.9	20.3	16.9

Table 3.--Area of commercial forest land, by forest-type group and county, 1969

County	All type groups	Forest-type groups					
		Longleaf-slash pine	Loblolly-shortleaf pine	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood
	Thousand acres						
Bay	422.5	305.6	16.6	22.7	50.0	27.6	--
Calhoun	309.6	141.0	30.3	36.2	42.1	47.4	12.6
Escambia	279.5	174.7	5.2	50.5	18.9	22.7	7.5
Franklin	306.2	178.4	12.3	45.0	12.3	58.2	--
Gadsden	229.6	24.5	45.4	26.1	73.7	59.9	--
Gulf	332.4	188.6	5.9	33.7	3.0	101.2	--
Holmes	203.7	87.4	10.0	24.4	32.3	49.6	--
Jackson	338.9	94.2	34.0	23.5	119.9	56.5	10.8
Jefferson	275.2	62.9	34.4	44.5	35.0	95.1	3.3
Leon	318.4	114.1	46.9	41.4	54.5	58.2	3.3
Liberty	524.2	241.5	27.0	54.0	33.3	168.4	--
Okaloosa	470.7	123.8	38.9	117.1	134.4	56.5	--
Santa Rosa	531.5	284.1	14.6	84.5	71.2	70.4	6.7
Wakulla	348.6	183.5	36.4	34.5	48.9	45.3	--
Walton	537.5	196.8	54.9	104.9	110.6	70.3	--
Washington	306.7	83.0	20.3	31.2	94.6	77.6	--
Total	5,735.2	2,484.1	433.1	774.2	934.7	1,064.9	44.2

Table 4.--Area of commercial forest land, by stand-size class and county, 1969

County	All stands	Stand-size class			Nonstocked areas
		Sawtimber	Poletimber	Sapling and seedling	
	Thousand acres				
Bay	422.5	47.5	104.6	185.1	85.3
Calhoun	309.6	62.7	82.7	116.9	47.3
Escambia	279.5	110.4	58.7	97.6	12.8
Franklin	306.2	77.7	71.4	130.2	26.9
Gadsden	229.6	94.0	72.6	37.4	25.6
Gulf	332.4	77.9	77.0	132.9	44.6
Holmes	203.7	45.1	81.6	57.5	19.5
Jackson	338.9	75.3	105.9	119.9	37.8
Jefferson	275.2	137.3	63.5	66.6	7.8
Leon	318.4	133.0	99.9	64.8	20.7
Liberty	524.2	255.7	106.4	130.4	31.7
Okaloosa	470.7	160.7	80.0	110.9	119.1
Santa Rosa	531.5	150.4	146.0	173.7	61.4
Wakulla	348.6	139.4	117.7	71.2	20.3
Walton	537.5	126.7	149.6	173.2	88.0
Washington	306.7	87.2	56.0	96.8	66.7
Total	5,735.2	1,781.0	1,473.6	1,765.1	715.5

Table 5.--Area of commercial forest land, by site class and county, 1969

County	All classes	Site class				
		1	2	3	4	5
	Thousand acres					
Bay	422.5	--	--	13.6	168.2	240.7
Calhoun	309.6	--	--	63.6	201.9	44.1
Escambia	279.5	--	--	22.7	213.1	43.7
Franklin	306.2	--	3.7	14.6	166.1	121.8
Gadsden	229.6	--	3.6	49.0	144.8	32.2
Gulf	332.4	--	--	11.8	149.0	171.6
Holmes	203.7	--	3.3	37.2	127.6	35.6
Jackson	338.9	--	9.5	48.0	233.0	48.4
Jefferson	275.2	--	20.5	65.1	181.8	7.8
Leon	318.4	--	13.3	82.7	180.0	42.4
Liberty	524.2	--	--	74.7	233.4	216.1
Okaloosa	470.7	--	3.0	44.6	195.1	228.0
Santa Rosa	531.5	--	2.8	52.9	325.9	149.9
Wakulla	348.6	--	7.3	45.6	209.6	86.1
Walton	537.5	3.8	3.6	73.4	289.6	167.1
Washington	306.7	--	3.1	32.9	174.7	96.0
Total	5,735.2	3.8	73.7	732.4	3,193.8	1,731.5

Table 6.--Area of commercial forest land, by stocking classes of growing-stock trees, by county, 1969

County	All classes	Stocking percentage[1/]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
Bay	422.5	--	17.2	143.7	176.3	85.3
Calhoun	309.6	--	24.4	124.3	113.6	47.3
Escambia	279.5	7.6	30.3	141.6	87.2	12.8
Franklin	306.2	--	48.5	107.3	123.5	26.9
Gadsden	229.6	3.6	27.1	122.7	50.6	25.6
Gulf	332.4	5.9	39.6	114.6	127.7	44.6
Holmes	203.7	--	25.6	82.5	76.1	19.5
Jackson	338.9	7.0	35.4	167.1	91.5	37.9
Jefferson	275.2	3.3	46.1	141.1	76.9	7.8
Leon	318.4	--	25.2	161.6	110.9	20.7
Liberty	524.2	6.4	81.0	222.4	182.7	31.7
Okaloosa	470.7	6.4	22.1	106.9	216.2	119.1
Santa Rosa	531.5	13.0	47.9	211.4	197.8	61.4
Wakulla	348.6	3.3	25.4	165.9	133.8	20.2
Walton	537.5	2.5	31.6	206.8	208.6	88.0
Washington	306.7	3.1	11.0	84.8	141.1	66.7
Total	5,735.2	62.1	538.4	2,304.7	2,114.5	715.5

1/ See stocking standards on page 12.

COUNTY TABLES

The county tables are intended for use in compiling forest resource estimates for groups of counties. Because the sampling procedure used by the Forest Survey in Northwest Florida was intended primarily to furnish inventory data for the Unit as a whole, individual county estimates have limited and variable accuracy. As county totals are broken down by various subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase can be computed with the formula on page 5.

Table 1.--Area, by land class and county, 1969

County	All land[1/]	Forest land				Nonforest land[2/]
		Total	Commercial forest	Unproductive forest	Productive reserved	
	Thousand acres					
Bay	494.8	423.2	422.5	0.2	0.5	71.6
Calhoun	362.1	309.6	309.6	--	--	52.5
Escambia	417.4	281.7	279.5	1.7	0.5	135.7
Franklin	348.8	307.0	306.2	0.7	0.1	41.8
Gadsden	328.1	229.6	229.6	--	--	98.5
Gulf	363.2	334.2	332.4	1.3	0.5	29.0
Holmes	309.0	203.7	203.7	--	--	105.3
Jackson	601.1	340.5	338.9	--	1.6	260.6
Jefferson	384.4	275.2	275.2	--	--	109.2
Leon	430.5	319.0	318.4	--	0.6	111.5
Liberty	540.2	525.3	524.2	--	1.1	14.9
Okaloosa	586.8	471.3	470.7	--	0.6	115.5
Santa Rosa	649.8	531.5	531.5	--	(3/)	118.3
Wakulla	395.8	349.0	348.6	--	0.4	46.8
Walton	686.9	544.5	537.5	6.9	0.1	142.4
Washington	387.1	306.9	306.7	--	0.2	80.2
Total	7,286.0	5,752.2	5,735.2	10.8	6.2	1,533.8

1/ From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

2/ Includes 62,400 acres of water according to Survey standards of area classification but defined by the Bureau of the Census as land.

3/ Less than 50 acres.

Table 2.--Area of commercial forest land, by ownership class and county, 1969

County	All ownerships	Ownership class							
		National Forest	Miscellaneous Federal	State	County and municipal	Forest industry 2/	Farmer	Miscellaneous private	
								Corporate	Individual
	Thousand acres								
Bay	422.5	--	22.2	5.2	0.2	238.5	--	--	156.4
Calhoun	309.6	2.8	--	0.2	--	162.1	59.3	7.4	77.8
Escambia	279.5	--	2.9	0.9	0.7	85.4	75.8	11.4	102.4
Franklin	306.2	21.0	7.2	--	0.7	266.7	--	--	10.6
Gadsden	229.6	--	(1/)	1.6	0.3	73.7	75.2	25.1	53.7
Gulf	332.4	--	--	(1/)	--	220.8	78.8	6.6	26.2
Holmes	203.7	--	--	0.2	0.6	52.1	90.5	--	60.3
Jackson	338.9	--	5.2	0.3	0.3	48.9	157.9	3.5	122.8
Jefferson	275.2	--	4.3	0.2	0.1	121.1	33.2	--	116.3
Leon	318.4	101.5	--	0.1	1.7	56.1	39.8	9.9	109.3
Liberty	524.2	257.3	--	--	--	191.4	23.6	--	51.9
Okaloosa	470.7	--	211.2	59.4	0.9	42.1	69.5	3.0	84.6
Santa Rosa	531.5	--	62.4	119.8	0.4	161.5	35.1	7.8	144.5
Wakulla	348.6	163.5	33.0	0.2	0.1	53.6	10.5	--	87.7
Walton	537.5	--	136.9	0.1	--	140.7	97.9	--	161.9
Washington	306.7	--	--	1.7	0.5	38.1	74.3	--	192.1
Total	5,735.2	546.1	485.3	189.9	6.5	1,952.8	921.4	74.7	1,558.5

1/ Less than 50 acres.
2/ Not including 69,800 acres of farmer and miscellaneous private lands leased to forest industry.

Table 9.--Annual removals of sawtimber and growing stock on commercial forest land, by species group and county, 1968

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Bay	16.0	14.9	--	1.1	--	8.4	7.2	--	1.2	--
Calhoun	12.6	7.8	--	1.1	3.7	3.7	2.5	--	0.2	1.0
Escambia	31.4	29.6	--	1.8	--	8.5	8.0	--	0.4	0.1
Franklin	10.2	8.9	--	--	1.3	3.3	2.4	0.3	0.3	0.3
Gadsden	19.8	11.7	--	3.0	5.1	5.1	3.0	--	0.9	1.2
Gulf	7.4	3.5	--	1.6	2.3	2.3	1.2	--	0.5	0.6
Holmes	15.7	8.9	--	0.4	6.4	5.4	3.3	--	0.1	2.0
Jackson	26.4	11.7	--	6.3	8.4	8.5	4.9	--	1.5	2.1
Jefferson	38.8	30.7	1.8	1.6	4.7	11.2	7.0	0.5	1.5	2.2
Leon	26.4	18.6	--	3.0	4.8	8.0	5.6	--	1.0	1.4
Liberty	17.7	8.3	2.2	4.2	3.0	6.1	3.6	0.4	1.2	0.9
Okaloosa	19.3	18.8	--	0.5	--	6.0	4.8	--	1.2	--
Santa Rosa	56.0	52.9	--	1.9	1.2	12.6	11.9	--	0.4	0.3
Wakulla	20.5	18.2	--	1.0	1.3	5.3	4.7	--	0.3	0.3
Walton	12.9	10.9	--	0.7	1.3	5.0	3.9	--	0.5	0.6
Washington	18.0	16.6	--	1.4	--	5.8	4.9	--	0.9	--
Total	349.1	272.0	4.0	29.6	43.5	105.2	78.9	1.2	12.1	13.0

Table 10.--Area of commercial forest land, by forest type and ownership class, 1969

Forest type	All ownerships	Ownership class				
		National Forest	Other public	Forest industry	Farmer	Misc. private
	Thousand acres					
Softwood types:						
Longleaf pine	791.6	151.6	120.1	243.9	117.3	158.7
Slash pine	1,692.5	166.8	127.3	836.7	150.5	411.2
Loblolly pine	191.6	--	4.5	55.8	45.8	85.5
Shortleaf pine	34.5	--	--	6.8	10.3	17.4
Sand pine	99.3	--	40.5	13.8	3.3	41.7
Pond pine	100.9	54.1	--	24.2	8.4	14.2
Spruce pine	6.8	--	--	3.1	--	3.7
Total	2,917.2	372.5	292.4	1,184.3	335.6	732.4
Hardwood types:						
Oak pine	774.2	53.5	175.5	217.1	150.6	177.5
Oak-hickory	414.9	--	8.3	57.6	132.7	216.3
Southern scrub oak	519.8	6.3	145.0	96.0	64.2	208.3
Oak-gum-cypress	1,064.9	113.8	60.5	375.1	224.4	291.1
Elm-ash-cottonwood	44.2	--	--	22.7	13.9	7.6
Total	2,818.0	173.6	389.3	768.5	585.8	900.8
All types	5,735.2	546.1	681.7	1,952.8	921.4	1,633.2

Table 11.--Area of commercial forest land, by ownership and stocking classes of growing-stock trees, 1969

Ownership classes	All classes	Stocking percentage[1/]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
National Forest	546.1	3.3	66.7	214.5	230.9	30.7
Other public	681.7	12.2	36.0	198.3	288.8	146.4
Forest industry	1,952.8	18.1	226.5	831.0	690.0	187.2
Farmer	921.4	6.7	62.5	422.5	317.7	112.0
Misc. private	1,633.2	21.8	146.7	638.4	587.1	239.2
All ownerships	5,735.2	62.1	538.4	2,304.7	2,114.5	715.5

1/ See stocking standards on page 12.

Table 12.--Volume of timber on commercial forest land, by class and species group, 1969

Class of timber	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	- - - - - - Million cubic feet - - - - - -				
Sawtimber trees:					
Saw-log portion	2,139.4	1,115.0	207.6	536.4	280.4
Upper-stem portion	232.0	97.9	14.5	80.0	39.6
Total	2,371.4	1,212.9	222.1	616.4	320.0
Poletimber trees	1,260.1	635.0	78.8	378.2	168.1
All growing-stock trees	3,631.5	1,847.9	300.9	994.6	488.1
Rough trees:					
Sawtimber-size trees	148.7	5.2	9.0	56.2	78.3
Poletimber-size trees	269.5	8.5	14.2	115.5	131.3
Total	418.2	13.7	23.2	171.7	209.6
Rotten trees:					
Sawtimber-size trees	110.0	0.8	16.9	62.3	30.0
Poletimber-size trees	18.9	0.8	3.0	11.0	4.1
Total	128.9	1.6	19.9	73.3	34.1
Salvable dead trees:					
Sawtimber-size trees	1.4	0.6	--	--	0.8
Poletimber-size trees	3.9	1.3	--	0.9	1.7
Total	5.3	1.9	--	0.9	2.5
Total, all timber	4,183.9	1,865.1	344.0	1,240.5	734.3

Table 13.--Number of growing-stock trees on commercial forest land, by species and diameter class, 1969

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees										
Softwood:											
Longleaf pine	94,201	34,619	25,949	18,366	10,939	3,251	766	263	36	12	--
Slash pine	119,037	68,020	25,162	12,920	6,825	3,644	1,492	623	186	163	2
Loblolly pine	24,040	8,208	5,380	3,562	2,344	1,590	1,018	467	227	160	3
Shortleaf pine	3,042	1,755	782	472	309	163	66	39	47	9	--
Pond pine	7,680	3,740	1,628	1,090	638	375	155	46	--	8	--
Spruce pine	1,929	558	453	202	255	210	131	94	12	14	--
Sand pine	6,385	2,690	1,971	816	528	227	72	16	--	5	--
Baldcypress	6,296	2,674	986	698	466	637	319	305	76	114	21
Pondcypress	22,897	8,332	6,646	3,432	2,140	1,279	596	303	78	86	5
Atlantic white cedar	5,826	2,155	1,147	1,153	606	385	181	144	35	20	--
Eastern redcedar	326	165	40	94	--	12	8	7	--	--	--
Total softwoods	291,208	133,006	70,144	42,805	25,050	11,773	4,804	2,307	697	591	31
Hardwood:											
Select white oaks[1]	1,101	149	172	210	238	162	85	58	23	4	--
Select red oaks[2]	40	--	--	28	--	12	--	--	--	--	--
Other white oaks	5,787	2,254	950	665	606	439	330	209	120	195	19
Other red oaks	31,580	13,902	7,429	3,982	2,454	1,691	896	621	295	299	11
Hickory	3,690	1,399	751	522	329	352	179	44	40	74	--
Florida maple	454	80	123	88	83	35	38	7	--	--	--
Soft maple	3,527	1,811	826	367	195	158	78	50	12	30	--
Beech	271	70	--	40	48	26	18	23	6	37	3
Sweetgum	12,805	5,409	2,881	1,718	1,237	747	393	206	89	120	5
Tupelo and blackgum	45,541	15,017	10,057	7,334	4,987	3,220	2,159	1,332	731	651	53
Ash	5,285	2,132	1,139	708	436	260	274	178	87	69	2
Cottonwood	64	--	--	21	13	13	--	7	6	4	--
Basswood	26	--	--	26	--	--	--	--	--	--	--
Yellow-poplar	2,612	539	802	467	442	110	174	52	22	4	--
Elm	1,838	768	452	321	110	113	39	21	12	--	2
Sycamore	229	75	37	26	18	46	21	--	6	--	--
Black cherry	359	234	45	44	19	--	9	8	--	--	--
Sweetbay	25,321	10,738	5,478	4,048	2,708	1,161	695	307	107	75	4
River birch	245	48	39	86	38	24	10	--	--	--	--
Hackberry	546	51	176	94	61	46	81	22	11	4	--
Other eastern hardwoods	4,475	2,105	860	499	373	348	157	79	29	25	--
Total hardwoods	145,796	56,781	32,217	21,694	14,395	8,963	5,636	3,224	1,596	1,591	99
All species	437,004	189,787	102,361	64,099	39,445	20,736	10,440	5,531	2,293	2,182	130

1/ Includes white and swamp chestnut oaks.
2/ Shumard oak.

Table 14.--Volume of all live trees on commercial forest land, by species and diameter class, 1969

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	758.1	89.5	165.7	212.9	182.4	73.2	22.0	9.7	2.0	0.7	--
Slash pine	720.2	145.4	144.9	140.7	112.3	87.1	47.3	25.5	9.2	7.6	0.2
Loblolly pine	232.4	18.3	30.5	36.6	37.6	36.8	32.6	20.0	12.2	7.7	0.1
Shortleaf pine	28.5	3.8	4.9	4.9	4.6	3.5	2.2	1.6	2.6	0.4	--
Pond pine	48.7	7.1	8.6	10.0	8.5	8.2	4.2	1.6	--	0.5	--
Spruce pine	29.2	1.4	3.3	2.4	4.9	6.1	5.1	4.6	0.7	0.7	--
Sand pine	46.1	8.6	12.3	8.9	8.6	5.3	1.9	0.4	--	0.1	--
Baldcypress	94.7	8.9	7.3	8.0	8.1	17.6	12.2	13.3	4.6	6.7	8.0
Pondcypress	185.4	26.8	38.2	33.4	28.4	23.6	14.8	10.5	3.8	4.1	1.8
Atlantic white cedar	61.6	6.4	8.1	13.7	10.0	8.9	5.9	5.7	1.8	1.1	--
Eastern redcedar	2.3	0.2	0.1	0.8	0.2	0.3	0.4	0.3	--	--	--
Total softwoods	2,207.2	316.4	423.9	472.3	405.6	270.6	148.6	93.2	36.9	29.6	10.1
Hardwood:											
Select white oaks[1]	19.2	0.6	1.2	2.2	4.2	4.0	2.7	2.6	1.2	0.5	--
Select red oaks[2]	0.5	--	--	0.2	--	0.3	--	--	--	--	--
Other white oaks	119.5	9.6	10.8	11.0	12.2	13.6	12.9	10.0	10.3	21.8	7.3
Other red oaks	310.6	38.6	46.9	41.0	41.3	37.5	26.3	27.8	18.4	28.4	4.4
Hickory	45.9	3.4	4.9	6.2	5.7	7.8	5.6	2.7	2.8	6.8	--
Florida maple	7.7	0.7	1.6	1.1	1.5	1.3	1.1	0.4	--	--	--
Soft maple	43.8	9.1	8.1	6.8	6.0	4.2	2.7	2.4	1.6	2.9	--
Beech	11.8	0.2	--	0.4	0.8	0.8	0.5	1.4	0.2	5.7	1.8
Sweetgum	142.9	14.3	20.5	20.2	23.8	20.3	14.2	10.8	5.9	10.9	2.0
Tupelo and blackgum	667.1	68.0	85.0	95.1	99.1	79.8	70.5	62.6	41.1	55.6	10.3
Ash	91.4	11.4	12.6	10.6	13.0	8.3	10.3	10.3	5.7	7.9	1.3
Cottonwood	1.8	--	--	0.2	0.4	0.3	--	0.3	0.2	0.4	--
Basswood	0.5	--	--	0.2	0.3	--	--	--	--	--	--
Yellow-poplar	29.8	1.6	4.8	4.5	7.3	2.4	5.2	2.4	1.2	0.4	--
Elm	20.8	3.2	3.8	3.9	2.3	2.7	1.2	1.7	1.0	0.5	0.5
Sycamore	4.0	0.3	0.3	0.7	0.3	1.4	0.6	--	0.4	--	--
Black cherry	2.8	0.3	0.2	0.8	0.3	--	0.6	0.3	--	0.3	--
Sweetbay	275.8	40.6	45.8	51.2	51.7	30.0	24.8	14.3	8.0	7.6	1.8
River birch	3.3	0.5	0.2	1.1	0.5	0.7	0.3	--	--	--	--
Hackberry	12.1	0.4	1.2	1.0	1.8	1.8	3.2	1.2	1.0	0.5	--
Other eastern hardwoods	160.1	41.6	35.4	22.1	14.2	12.4	9.4	6.8	5.4	10.2	2.6
Total hardwoods	1,971.4	244.4	283.3	280.5	286.7	229.6	192.1	158.0	104.4	160.4	32.0
All species	4,178.6	560.8	707.2	752.8	692.3	500.2	340.7	251.2	141.3	190.0	42.1

1/ Includes white and swamp chestnut oaks.
2/ Shumard oak.

Table 15.--Volume of growing stock on commercial forest land, by species and diameter class, 1969

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	754.6	89.3	165.1	211.4	181.9	72.9	22.0	9.7	1.6	0.7	--
Slash pine	717.8	144.6	143.6	140.6	112.3	86.9	47.3	25.5	9.2	7.6	0.2
Loblolly pine	229.1	17.3	29.0	35.8	37.6	36.8	32.6	20.0	12.2	7.7	0.1
Shortleaf pine	27.5	3.7	4.6	4.5	4.4	3.5	2.2	1.6	2.6	0.4	--
Pond pine	47.1	6.5	8.4	9.5	8.4	8.2	4.2	1.4	--	0.5	--
Spruce pine	28.6	1.4	2.8	2.4	4.9	6.0	5.1	4.6	0.7	0.7	--
Sand pine	43.2	7.3	11.4	8.6	8.4	5.1	1.9	0.4	--	0.1	--
Baldcypress	87.1	8.3	7.2	7.6	7.6	17.5	12.2	13.3	4.6	6.2	2.6
Pondcypress	155.1	19.6	31.0	27.6	25.7	22.3	12.6	9.6	3.0	3.3	0.4
Atlantic white cedar	56.7	5.4	7.0	12.7	9.9	8.6	5.3	5.4	1.5	0.9	--
Eastern redcedar	2.0	0.2	0.1	0.8	--	0.2	0.4	0.3	--	--	--
Total softwoods	2,148.8	303.6	410.2	461.5	401.1	268.0	145.8	91.8	35.4	28.1	3.3
Hardwood:											
Select white oaks[1]	17.8	0.3	1.1	2.0	3.9	3.7	2.7	2.6	1.2	0.3	--
Select red oaks[2]	0.5	--	--	0.2	--	0.3	--	--	--	--	--
Other white oaks	75.6	5.2	4.9	5.9	8.5	9.0	8.7	7.8	6.1	16.2	3.3
Other red oaks	263.9	33.3	40.9	35.5	33.7	32.7	23.6	24.3	14.8	22.8	2.3
Hickory	41.4	3.1	3.9	4.7	5.2	7.5	5.6	2.0	2.6	6.8	--
Florida maple	5.3	0.2	0.6	0.8	1.3	0.9	1.1	0.4	--	--	--
Soft maple	26.7	4.9	4.8	3.7	3.1	3.4	1.9	1.9	0.6	2.4	--
Beech	9.2	0.2	--	0.4	0.8	0.5	0.5	1.1	0.2	5.0	0.5
Sweetgum	131.0	11.6	18.1	18.6	22.7	18.9	13.6	10.2	5.7	10.4	1.2
Tupelo and blackgum	523.5	42.7	60.1	75.5	80.5	69.7	62.3	53.0	34.2	39.9	5.6
Ash	64.6	4.7	6.5	6.8	8.1	7.2	9.5	9.1	5.2	7.1	0.4
Cottonwood	1.6	--	--	0.2	0.2	0.3	--	0.3	0.2	0.4	--
Basswood	0.2	--	--	0.2	--	--	--	--	--	--	--
Yellow-poplar	29.4	1.6	4.8	4.5	7.3	2.4	4.9	2.3	1.2	0.4	--
Elm	16.3	2.1	2.8	3.3	2.1	2.7	1.2	1.0	0.6	--	0.5
Sycamore	3.6	0.3	0.2	0.4	0.3	1.4	0.6	--	0.4	--	--
Black cherry	2.0	0.3	0.2	0.5	0.3	--	0.4	0.3	--	--	--
Sweetbay	217.5	29.3	33.6	42.7	42.9	24.8	20.3	12.3	5.2	5.5	0.9
River birch	2.9	0.3	0.2	1.1	0.5	0.5	0.3	--	--	--	--
Hackberry	11.1	0.3	1.2	1.0	1.4	1.3	3.2	1.2	1.0	0.5	--
Other eastern hardwoods	38.6	4.5	5.0	4.5	5.7	7.2	4.6	3.3	1.7	2.1	--
Total hardwoods	1,482.7	144.9	188.9	212.5	228.5	194.4	165.0	133.1	80.9	119.8	14.7
All species	3,631.5	448.5	599.1	674.0	629.6	462.4	310.8	224.9	116.3	147.9	18.0

1/ Includes white and swamp chestnut oaks.
2/ Shumard oak.

Table 16.--Volume of sawtimber on commercial forest land, by species and diameter class, 1969

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	2,239.2	826.9	844.6	374.9	104.8	53.1	10.1	4.8	--
Slash pine	1,955.7	497.3	496.7	438.6	265.8	141.7	57.1	56.9	1.6
Loblolly pine	877.2	118.7	161.4	178.5	175.0	107.0	80.8	54.7	1.1
Shortleaf pine	87.7	14.6	18.1	17.1	12.0	8.1	15.1	2.7	--
Pond pine	135.6	30.8	33.0	39.5	21.6	7.6	--	3.1	--
Spruce pine	118.2	8.7	19.7	30.2	27.0	23.9	4.2	4.5	--
Sand pine	107.2	32.8	37.5	24.0	9.7	2.3	--	0.9	--
Baldcypress	377.3	22.0	30.2	91.1	66.5	71.4	33.6	43.5	19.0
Pondcypress	400.5	81.1	91.9	90.1	56.3	43.6	15.1	20.8	2.2
Atlantic white cedar	180.8	43.6	37.7	37.2	24.2	24.5	7.6	6.0	--
Eastern redcedar	6.6	2.2	--	0.6	2.2	1.6	--	--	--
Total softwoods	6,486.0	1,678.7	1,770.8	1,321.8	785.1	484.8	223.6	197.3	23.9
Hardwood:									
Select white oaks[1/]	63.7	--	14.3	16.0	13.4	13.7	5.1	1.2	--
Select red oaks[2/]	1.1	--	--	1.1	--	--	--	--	--
Other white oaks	227.8	--	26.8	32.7	36.8	30.3	27.8	60.3	13.1
Other red oaks	692.3	--	124.3	144.8	116.0	123.0	76.9	97.8	9.5
Hickory	121.3	--	15.2	29.8	26.2	9.5	13.2	27.4	--
Florida maple	14.2	--	4.1	3.2	4.9	2.0	--	--	--
Soft maple	51.6	--	10.4	12.2	7.8	8.4	2.9	9.9	--
Beech	34.3	--	2.4	1.7	2.1	4.8	0.9	20.9	1.5
Sweetgum	343.5	--	79.0	72.7	66.5	48.4	28.0	43.9	5.0
Tupelo and blackgum	1,282.9	--	231.3	249.1	254.2	226.1	148.4	150.5	23.3
Ash	184.6	--	22.5	25.9	43.0	41.9	25.0	25.1	1.2
Cottonwood	6.4	--	0.5	1.8	--	1.8	0.6	1.7	--
Basswood	--	--	--	--	--	--	--	--	--
Yellow-poplar	80.8	--	26.1	9.4	25.4	12.0	6.5	1.4	--
Elm	31.0	--	7.2	9.3	5.0	4.6	3.0	--	1.9
Sycamore	11.6	--	0.6	5.7	3.6	--	1.7	--	--
Black cherry	5.1	--	0.9	--	2.7	1.5	--	--	--
Sweetbay	414.0	--	137.9	92.8	85.0	54.8	21.2	19.7	2.6
River birch	4.2	--	1.8	1.3	1.1	--	--	--	--
Hackberry	32.5	--	3.6	5.0	13.0	5.6	4.0	1.3	--
Other eastern hardwoods	100.7	--	19.9	24.6	23.0	16.5	8.4	8.3	--
Total hardwoods	3,703.6	--	728.8	739.1	729.7	604.9	373.6	469.4	58.1
All species	10,189.6	1,678.7	2,499.6	2,060.9	1,514.8	1,089.7	597.2	666.7	82.0

1/ Includes white and swamp chestnut oaks.
2/ Shumard oak.

Table 17.--Net annual growth and removals of growing stock on commercial forest land, by species, 1968

Species	Net annual growth	Annual timber removals
	- - - - Million cubic feet - - - -	
Softwood:		
Yellow pines	121.0	78.9
Cypress	3.8	0.9
Other eastern softwoods	2.1	0.3
Total softwoods	126.9	80.1
Hardwood:		
Select white and red oaks	0.7	0.4
Other white and red oaks	13.5	8.6
Hickory	1.1	2.8
Hard maple	--	--
Sweetgum	4.0	2.3
Ash, walnut, and black cherry	1.2	1.0
Yellow-poplar	1.1	1.0
Other hardwoods	15.6	9.0
Total hardwoods	37.2	25.1
All species	164.1	105.2

Table 18.--Net annual growth and removals of sawtimber on commercial forest land, by species, 1968

Species	Net annual growth	Annual timber removals
	- - - - Million board feet - - - -	
Softwood:		
Yellow pines	424.5	272.0
Cypress	13.8	4.0
Other eastern softwoods	8.1	--
Total softwoods	446.4	276.0
Hardwood:		
Select white and red oaks	2.3	1.8
Other white and red oaks	40.0	26.8
Hickory	4.0	10.1
Hard maple	0.3	--
Sweetgum	13.1	7.6
Ash, walnut, and black cherry	4.8	4.2
Yellow-poplar	4.5	2.4
Other hardwoods	47.9	20.2
Total hardwoods	116.9	73.1
All species	563.3	349.1

Table 19.--Mortality of growing stock and sawtimber on commercial forest land, by species, 1968

Species	Growing stock	Sawtimber
	Million cubic feet	Million board feet
Softwood:		
Yellow pines	5.8	17.4
Cypress	0.3	1.5
Other eastern softwoods	--	--
Total softwoods	6.1	18.9
Hardwood:		
Select white and red oaks	0.1	0.4
Other white and red oaks	3.2	11.0
Hickory	0.3	0.9
Hard maple	--	--
Sweetgum	0.4	0.5
Ash, walnut, and black cherry	0.8	2.3
Yellow-poplar	0.7	1.7
Other hardwoods	3.5	7.0
Total hardwoods	9.0	23.8
All species	15.1	42.7

Table 20.--Volume of all live trees and growing stock on commercial forest land, by ownership class and species group, 1969

Ownership class	All live trees					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	483.8	285.5	71.1	102.2	25.0	434.8	284.5	55.9	80.0	14.4
Other public	481.2	319.6	31.2	80.3	50.1	424.1	316.4	29.7	59.0	19.0
Forest industry	1,498.5	612.4	155.5	481.5	249.1	1,291.9	607.9	139.0	381.9	163.1
Farmer	644.3	236.8	28.8	245.5	133.2	563.3	234.6	24.4	205.4	98.9
Miscellaneous private	1,070.8	408.9	57.4	330.1	274.4	917.4	404.5	51.9	268.3	192.7
All ownerships	4,178.6	1,863.2	344.0	1,239.6	731.8	3,631.5	1,847.9	300.9	994.6	488.1

Table 21.--Volume of sawtimber on commercial forest land, by ownership class and species group, 1969

Ownership class	Small sawtimber[1]					Large sawtimber[2]				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	885.3	711.3	96.6	63.3	14.1	334.7	142.1	49.5	109.1	34.0
Other public	966.5	835.5	46.8	58.7	25.5	320.3	183.5	64.1	59.4	13.3
Forest industry	2,127.2	1,384.8	250.7	344.3	147.4	1,623.6	387.4	212.5	666.4	357.3
Farmer	893.1	513.9	45.8	233.0	100.4	583.5	211.0	18.9	210.2	143.4
Miscellaneous private	1,367.1	798.1	87.8	294.7	186.5	1,088.3	353.2	92.5	314.2	328.4
All ownerships	6,239.2	4,243.6	527.7	994.0	473.9	3,950.4	1,277.2	437.5	1,359.3	876.4

1/ Volume of sawtimber trees less than 15.0 inches at d.b.h.
2/ Volume of sawtimber trees 15.0 inches and larger at d.b.h.

Table 22.--Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group, 1968

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	17.8	14.8	0.9	1.7	0.4	2.6	2.3	0.2	0.1	--
Other public	20.6	17.6	0.8	1.4	0.8	7.8	7.4	--	0.4	--
Forest industry	56.1	41.7	3.0	6.8	4.6	45.1	34.8	0.3	5.6	4.4
Farmer	26.6	17.4	0.4	4.8	4.0	18.3	13.9	0.2	0.3	3.9
Miscellaneous private	43.0	29.5	0.8	5.6	7.1	31.4	20.5	0.5	5.7	4.7
All ownerships	164.1	121.0	5.9	20.3	16.9	105.2	78.9	1.2	12.1	13.0

Table 23.--Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group, 1968

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	66.7	58.0	2.9	4.1	1.7	6.9	5.7	0.8	0.4	--
Other public	83.0	74.2	3.3	3.5	2.0	31.8	31.1	--	0.7	--
Forest industry	184.9	135.6	10.8	21.8	16.7	151.2	118.9	--	15.2	17.1
Farmer	84.5	57.1	1.7	13.2	12.5	60.8	45.9	1.4	1.1	12.4
Miscellaneous private	144.2	99.6	3.2	21.2	20.2	98.4	70.4	1.8	12.2	14.0
All ownerships	563.3	424.5	21.9	63.8	53.1	349.1	272.0	4.0	29.6	43.5

Table 24.--Average net volume per acre of sawtimber, growing stock, and other live timber[1/] on commercial forest land, by ownership class, major forest type, and species group, 1969

Forest type, species group, and class of material	Ownership class											
	All ownerships		National Forest		Other public		Forest industry		Farmer		Misc. private	
	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet
Pine types:												
Growing stock:												
Softwood	1,357	487	1,772	632	2,258	725	1,123	409	1,431	512	1,079	421
Hardwood	41	23	2	10	31	35	44	18	78	34	48	28
Total	1,398	510	1,774	642	2,289	760	1,167	427	1,509	546	1,127	449
Other timber:												
Softwood	--	5	--	4	--	6	--	6	--	4	--	3
Hardwood	--	12	--	6	--	29	--	8	--	12	--	14
Total	--	17	--	10	--	35	--	14	--	16	--	17
Oak-pine type:												
Growing stock:												
Softwood	1,308	386	1,473	371	1,079	350	1,626	480	1,269	363	1,113	325
Hardwood	309	164	457	193	168	67	240	152	457	259	381	197
Total	1,617	550	1,930	564	1,247	417	1,866	632	1,726	622	1,494	522
Other timber:												
Softwood	--	8	--	4	--	2	--	17	--	7	--	6
Hardwood	--	73	--	74	--	63	--	65	--	79	--	90
Total	--	81	--	78	--	65	--	82	--	86	--	96
Upland hardwood types:												
Growing stock:												
Softwood	274	82	--	25	349	103	155	55	313	94	276	79
Hardwood	621	258	--	--	14	11	567	218	919	381	756	320
Total	895	340	--	25	363	114	722	273	1,232	475	1,032	399
Other timber:												
Softwood	--	3	--	--	--	7	--	1	--	2	--	2
Hardwood	--	92	--	83	--	54	--	111	--	108	--	93
Total	--	95	--	83	--	61	--	112	--	110	--	95
Bottomland hardwood types:												
Growing stock:												
Softwood	1,134	316	1,657	533	2,347	510	1,214	341	575	171	943	253
Hardwood	2,507	951	1,550	636	1,769	819	3,209	1,107	1,971	860	2,490	962
Total	3,641	1,267	3,207	1,169	4,116	1,329	4,423	1,448	2,546	1,031	3,433	1,215
Other timber:												
Softwood	--	32	--	115	--	19	--	25	--	19	--	20
Hardwood	--	282	--	206	--	352	--	351	--	182	--	279
Total	--	314	--	321	--	371	--	376	--	201	--	299
All types:												
Growing stock:												
Softwood	1,131	375	1,698	578	1,545	473	1,120	374	935	307	846	290
Hardwood	646	259	374	160	214	107	759	273	813	360	714	293
Total	1,777	634	2,072	738	1,759	580	1,879	647	1,748	667	1,560	583
Other timber:												
Softwood	--	10	--	27	--	6	--	11	--	8	--	6
Hardwood	--	85	--	56	--	72	--	93	--	88	--	91
Total	--	95	--	83	--	78	--	104	--	96	--	97
All timber	1,777	729	2,072	821	1,759	658	1,879	751	1,748	763	1,560	680

1/ Rough and rotten trees.

Table 25.--Land area, by class, major forest type, and survey completion date, 1949, 1959, and 1969

Land use class	Survey completion date			Change 1959-1969
	1949	1959 [2]	1969	
	- - - - - Thousand acres - - - - -			
Forest land:				
Commercial forest land:				
Pine and oak-pine types	4,235.5	3,282.2	3,691.4	+409.2
Hardwood types	1,692.5	2,464.3	2,043.8	-420.5
Total	5,928.0	5,746.5	5,735.2	- 11.3
Noncommercial forest land:				
Productive-reserved	4.2	4.1	6.2	+ 2.1
Unproductive	127.9	17.0	10.8	- 6.2
Total	132.1	21.1	17.0	- 4.1
Nonforest land:				
Cropland	807.9	845.7	718.0	-127.7
Pasture and range	127.2	188.7	285.0	+ 96.3
Other	324.7	421.9	468.4	+ 46.5
Total	1,259.8	1,456.3	1,471.4	+ 15.1
All land [1]	7,319.9	7,223.9	7,223.6	- 0.3

1/ Excludes all water areas.
2/ These figures differ slightly from reported figures because of revisions in the estimates of land area.

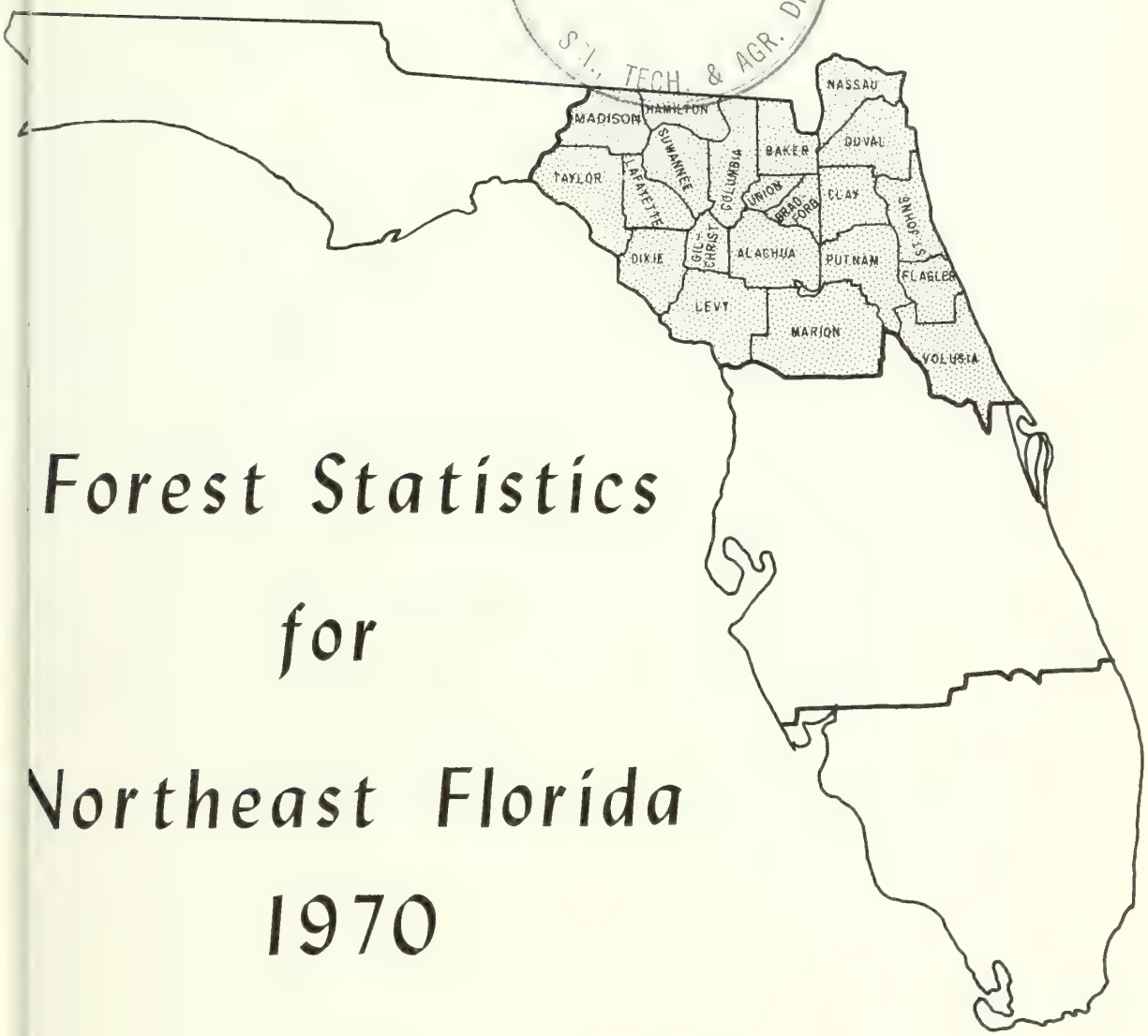
Table 26.--Volume[1/] of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date

Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
			SAWTIMBER (in million board feet)								
Softwood	1949	3,559.0	--	--	1,172.6	958.8	633.7	325.7	228.6	86.3	153.3
	1959	4,832.2	--	--	1,377.2	1,327.4	974.6	558.0	299.0	164.8	131.2
	1969	6,486.0	--	--	1,678.7	1,770.8	1,321.8	785.1	484.8	223.6	221.2
Hardwood	1949	3,299.6	--	--	--	603.7	653.8	611.4	524.9	381.0	524.8
	1959	3,265.4	--	--	--	596.7	708.3	690.7	486.8	321.8	461.1
	1969	3,703.6	--	--	--	728.8	739.1	729.7	604.9	373.6	527.5
			GROWING STOCK (in million cubic feet)								
Softwood	1949	1,268.6	192.4	268.8	322.4	217.2	128.5	60.5	43.3	13.7	21.8
	1959	1,678.8	215.5	381.4	378.7	300.6	197.6	103.6	56.6	26.1	18.7
	1969	2,148.8	303.6	410.2	461.5	401.1	268.0	145.8	91.8	35.4	31.4
Hardwood	1949	1,291.9	128.9	154.8	177.0	189.3	171.9	138.3	115.5	82.5	133.7
	1959	1,352.0	132.9	177.2	218.0	187.1	186.2	156.3	107.1	69.7	117.5
	1969	1,482.7	144.9	188.9	212.5	228.5	194.4	165.0	133.1	80.9	134.5
			ALL LIVE TIMBER (in million cubic feet)								
Softwood	1949	1,304.8	200.4	277.6	329.9	219.7	129.7	61.7	43.9	14.3	27.6
	1959	1,723.3	224.4	394.0	387.4	304.1	199.5	105.6	57.5	27.2	23.6
	1969	2,207.2	316.4	423.9	472.3	405.6	270.6	148.6	93.2	36.9	39.7
Hardwood	1949	1,719.8	217.9	232.0	233.5	237.4	203.1	161.0	137.1	106.5	191.3
	1959	1,799.7	224.6	265.6	287.7	234.6	220.0	181.9	127.2	89.9	168.2
	1969	1,971.4	244.4	283.3	280.5	286.7	229.6	192.1	158.0	104.4	192.4

1/ To provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in previous surveys.

USDA Forest Service Resource Bulletin SE-15 February 1970

CLEMSON UNIVERSITY LIBRARY
MAY 27 1970
S.C. TECH. & AGR. DIV.



Forest Statistics for Northeast Florida 1970

Forest Service - U.S. Department of Agriculture
Southeastern Forest Experiment Station
Asheville, North Carolina

FOREWORD

This report highlights the principal findings of the fourth Forest Survey of the timber resource in Northeast Florida. The survey was started in February 1969 and completed in November 1969. Findings of the three previous surveys, completed in 1934, 1949, and 1959, provide the basis for measuring changes that have occurred and trends that have developed over the past 36 years. However, in this report, the primary emphasis is on the changes and trends that have taken place since the last survey.

Forest Survey, authorized by the McSweeney-McNary Forest Research Act of May 22, 1928, is a continuing nationwide undertaking by the regional experiment stations of the Forest Service, USDA. In Florida, Georgia, North Carolina, South Carolina, and Virginia, Forest Survey is an activity of the Southeastern Forest Experiment Station, with headquarters at Asheville, North Carolina. The general objective is to inventory periodically the forest lands, their extent, condition, and volume of timber, and to ascertain rates of forest growth and depletion. It is necessary to keep this basic information up to date to provide a sound basis for the formulation of forest policies and programs.

The 21-county area covered by this report is one of four Survey units in Florida. A comparable report, "Forest Statistics for Northwest Florida 1969," USDA Forest Service Resource Bulletin SE-14, was issued, and similar reports for the other two units will be issued as the Statewide survey progresses. When completed, this survey will provide updated statistics on the timber resource for all of Florida.

The Southeastern Station gratefully acknowledges the cooperation and assistance provided by the Division of Forestry, Florida Department of Agriculture and Consumer Services, in the collection of the field data.

Joe P. McClure, Project Leader of the Forest Survey in the Southeast, organized and coordinated the various phases of the Survey. Noel D. Cost was in charge of the data collection. William H. B. Haines was in charge of the computations. Richard L. Welch was responsible for compiling the timber removal and mortality information. Herbert A. Knight was in charge of the analysis and reporting.

Office personnel assisting in this report were:

Robert A. Cathey
Bertie W. Greene
Cecil C. Hutchins, Jr.
Joanne Hutchison
Doniev W. Jackson
Agnes C. Nichols
Louise Shuford
Sammy S. Wenningham
Dorothy S. White
Camilla E. Young

The field party included:

Thomas R. Bellamy and John D. Nesbit, Field Supervisors
Nolan L. Snyder, Field Assistant

Mervyn S. Allen
Robert E. Allen
Jacky D. Balkcom
David S. Carr
Gerald C. Craver
Edgar L. Davenport
Jeffrey E. Dukes
Leonard G. Edwards
Robert S. Hensley
Roy C. Henson
Harold D. Mathews
James F. Palmer
John F. Parlier, Jr.
Don F. Rogers
Richard J. White, Jr.

DEAN N. QUINNEY, Assistant Director
Division of Marketing, Utilization,
and Resources Research

Forest Statistics for Northeast Florida 1970

by
Joe P. McClure, Principal Resource Analyst

CONTENTS

Page

HIGHLIGHTS - 1

HOW THE FOREST SURVEY IS MADE - - - - - - - - - - - - - - - - - - - 3

RELIABILITY OF THE DATA - 4

DEFINITIONS OF TERMS - 6

COUNTY TABLES:

1. Area, by land class - 13
2. Area of commercial forest land, by ownership class - - - - - - 14
3. Area of commercial forest land, by forest-type group - - - - - 15
4. Area of commercial forest land, by stand-size class - - - - - 16
5. Area of commercial forest land, by site class - - - - - - - - 17
6. Area of commercial forest land, by stocking classes of growing-stock trees - 18
7. Volume of sawtimber and growing stock on commercial forest land, by species group - 19
8. Net annual growth of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - - - 20
9. Annual removals of sawtimber and growing stock on commercial forest land, by species group - - - - - - - - - - - - - - - - 21

UNIT TABLES:

10. Area of commercial forest land, by forest type and ownership class - 22
11. Area of commercial forest land, by ownership and stocking classes of growing-stock trees - - - - - - - - - - - - - - - - 22
12. Volume of timber on commercial forest land, by class and species group - 23
13. Number of growing-stock trees on commercial forest land, by species and diameter class - - - - - - - - - - - - - - - - - - 24
14. Volume of all live trees on commercial forest land, by species and diameter class - 25
15. Volume of growing stock on commercial forest land, by species and diameter class - 26
16. Volume of sawtimber on commercial forest land, by species and diameter class - 27
17. Net annual growth and removals of growing stock on commercial forest land, by species - - - - - - - - - - - - - - - - - 28
18. Net annual growth and removals of sawtimber on commercial forest land, by species - - - - - - - - - - - - - - - - - - - 29
19. Mortality of growing stock and sawtimber on commercial forest land, by species - 30
20. Volume of all live trees and growing stock on commercial forest land, by ownership class and species group - - - - - - 31
21. Volume of sawtimber on commercial forest land, by ownership class and species group - - - - - - - - - - - - - - - - - - 31
22. Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group - - - 32
23. Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group - - - - - 32
24. Average net volume per acre of sawtimber, growing stock, and other live timber on commercial forest land, by ownership class, major forest type, and species group - - - - - - - - 33
25. Land area, by class, major forest type, and survey completion date - 34
26. Volume of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date - - - - - - - - - - - - - - - - - - 35

HIGHLIGHTS

Since 1959 in Northeast Florida--

--area of commercial forest land declined by 190,000 acres, representing a net loss of less than 3 percent. This small net change, however, masks some major shifts which have taken place among the various land uses over the 11-year period. For example, about 510,000 acres of commercial forest land were diverted to pasture, urban developments, and cropland, while some 320,000 acres of land shifted back into commercial forest. Area of commercial forest land now totals almost 7.1 million acres, or 72 percent of total land area.

--about 1.3 million acres have been artificially regenerated. Now, about one out of every four acres of commercial forest shows evidence of artificial reforestation, which makes this 21-county area a leader in the proportion of forest land in plantations. Most of the planting has been slash pine, and trends in forest type show the area in slash pine has been increasing rapidly--up to 40 percent since 1959--to 2.8 million acres. Area in the longleaf pine type, which declined from 2.3 to 1.2 million acres between 1949 and 1959, decreased further to a new low of less than 0.5 million acres.

--nonstocked forest land has been sharply reduced from 1.7 to 0.9 million acres, or over 45 percent. Average stand density of all live trees 5.0 inches d.b.h. and larger is now 44 square feet per acre, compared to 36 square feet in 1959 and 33 square feet in 1949. A 53-percent increase in the average number of 4-inch softwood trees per acre is a further indicator of the improvement in stand density. Two out of every five acres, however, are still either poorly stocked or nonstocked.

--area of commercial forest land owned by forest industry has increased from 2.5 to almost 3.3 million acres, or 29 percent. An additional 0.4 million acres of commercial forest land under long-term lease places about one-half of the total commercial forest area under forest industry management. Farm woodland and other privately owned forest land together declined from 4.0 to 3.2 million acres, or 20 percent. Most of the publicly owned forest land is still concentrated in the Ocala National Forest, the Osceola National Forest, and the State-owned Camp Blanding property located in Clay County.

--volume of softwood growing stock has increased by almost 750 million cubic feet, or 29 percent. This increase followed a period of relatively minor change between 1949 and 1959. Slash pine, the leading species in 1959, has accounted for almost 80 percent of the increase in softwood volume and is now the predominant species in the area. Cypress is the second major softwood species and its

volume is up by 4 percent. Longleaf pine, on the other hand, is down by 18 percent. Volume of softwood sawtimber has increased from 7.3 to over 9.1 billion board feet, or 25 percent.

--volume of hardwood growing stock has increased by over 110 million cubic feet, or 7 percent. Hardwood volume had increased by less than 4 percent between the 1949 and 1959 surveys. Tupelo, blackgum, sweetgum, and other soft-textured species have accounted for 80 percent of the recent increase in hardwood volume. Volume of oak is down by 4 percent and volume of ash is up by 12 percent. Volume of hardwood sawtimber has increased from 4.2 to 4.5 billion board feet, or 7 percent.

In 1969--

--net growth of growing stock exceeded removals by an estimated 90 million cubic feet, or 48 percent. About 65 percent of this growth over removals was pine, 14 percent other softwoods, and 21 percent hardwood. By ownership, 46 percent of the growth over removals was on the private, nonindustrial lands, 37 percent on forest industry lands, and the remaining 17 percent on public lands.

--net growth of sawtimber exceeded removals by an estimated 175 million board feet, or 28 percent. About 56 percent of this growth over removals was pine, 25 percent other softwoods, and 19 percent hardwood. By ownership, 41 percent of the growth over removals was on the private, nonindustrial lands, 28 percent on forest industry lands, and the remaining 31 percent on public lands.

--removals of growing stock totaled 188 million cubic feet, up by two-thirds from the estimate of removals in 1958. Pine species accounted for almost 82 percent of total removals from growing stock. Of the remaining 18 percent, 8 percent was hard-textured hardwoods, 7 percent was soft-textured hardwoods, and 3 percent was cypress. Pulpwood is the leading product removed in terms of volume, and yearly reports show that the annual pulpwood harvest in Northeast Florida has increased about 40 percent over this remeasurement period. Sawtimber removals were distributed by species in roughly the same proportion as growing stock.

--mortality of growing stock totaled over 28 million cubic feet, which was well below the estimate of mortality in 1958. It was still enough mortality to reduce gross growth by almost 10 percent. Over 60 percent of the mortality was hardwood, and climatic factors were the leading identifiable causes of death.

HOW THE FOREST SURVEY IS MADE

The method of survey is essentially a sampling procedure designed to provide reliable statistics primarily at the State and Survey Unit levels. Individual county statistics are presented to permit adding any combination of counties together until the total is large enough to meet the desired degree of reliability. The basic steps of the survey procedure were as follows:

1. In 19 of the 21 counties, initial estimates of forest and nonforest areas were based on the classification of 31,777 sample clusters systematically spaced on the latest aerial photographs available. A subsample of 2,395 of these 16-point clusters were ground checked, and a linear regression was fitted to the data to develop the relationship between the photo and ground classification of the subsample. This procedure provided a means for adjusting the initial estimates of area for change in land use since date of photography and for photo misclassification.

2. In 2 of the 21 counties, aerial photography available was considered to be outdated. Estimates of forest and nonforest areas were determined by direct aerial observation of 8,797 sample points from fixed-wing aircraft along flight lines 2 miles apart. An interval timer was used to determine the sample points.

3. Estimates of timber volume and forest classifications were based on measurements recorded at 1,809 ground sample locations systematically distributed within the commercial forest land. A 10-point cluster of plots systematically spaced on an acre were measured at each of these sample locations using a basal area factor of 37.5 square feet per acre. Trees less than 5.0 inches d.b.h. were tallied on fixed-radius plots around the point centers.

4. Equations prepared from detailed measurements collected on the trees tallied at 1 out of every 20 sample locations were used to compute the volumes of individual tally trees. A mirror caliper and sectional aluminum poles were used to obtain the additional measurements on standing trees required to construct the volume equations. The same 5-percent subsample of plots used for the tree-volume study also served as a quality control of field measurements. Felled trees were measured at active cutting operations to provide utilization factors for product and species groups and to supplement the standing tree-volume study.

5. Estimates of growth, removals, and mortality were determined from the remeasurement of 1,563 permanent sample plots which were established in the third survey.

6. Ownership information was collected from local contacts, correspondence, and public records. In those counties where the sample missed a particular ownership class, temporary sample plots were added and measured to describe the forest conditions within the ownership class.

7. All field data were sent to Asheville for editing and were punched in cards and stored on magnetic tape for machine computing, sorting, and tabulation. Final estimates were based on statistical summaries of the data.

RELIABILITY OF THE DATA

Statistical analysis of these data indicates the following sampling errors:

	Percent
Per million acres of commercial forest land - - - - -	1.45
Per billion cubic feet of growing stock - - - - - - -	5.95
Per billion cubic feet of net annual growth - - - - -	1.41
Per billion cubic feet of annual removals - - - - - -	2.66

Sampling errors for county and unit totals,[1/] in terms of one standard error

County	Commercial forest area	Cubic-foot volume of growing stock		
		Inventory	Growth	Removals
	Sampling error[2/]			
Alachua	3.79	11.90	12.45	26.01
Baker	0.77	9.99	9.58	22.22
Bradford	2.29	14.89	16.65	32.21
Clay	3.14	14.85	16.81	29.50
Columbia	1.73	9.68	10.10	27.36
Dixie	1.33	9.37	10.45	26.06
Duval	2.85	13.16	12.05	28.85
Flagler	2.78	13.48	12.05	25.38
Gilchrist	4.47	16.97	20.66	55.17
Hamilton	2.39	13.00	14.75	24.90
Lafayette	1.75	14.25	15.23	29.31
Levy	2.13	9.05	9.36	22.38
Madison	1.63	11.59	11.94	26.57
Marion	2.37	9.19	8.75	23.24
Nassau	1.75	10.07	11.03	28.04
Putnam	2.42	16.18	14.05	28.09
St. Johns	2.23	11.71	11.08	27.89
Suwannee	4.68	16.38	18.52	27.65
Taylor	1.42	10.29	11.38	17.72
Union	2.35	17.72	15.04	40.19
Volusia	2.43	11.01	10.13	36.22
Unit total	0.54	2.65	2.67	6.13

1/ Sampling error of breakdowns of county and unit totals may be computed with the following formula:

$$e = \frac{(SE)\ \sqrt{(\text{Specified volume or area})}}{\sqrt{(\text{Volume or area total in question})}}$$

Where: e = Sampling error of the volume or area total in question.
SE = Specified sampling error in table.

2/ By random-sampling formula (in percent).

DEFINITIONS OF TERMS

Acceptable trees.--Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.

Basal area.--The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand, usually expressed as square feet of basal area per acre.

Commercial forest land.--Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

Commercial species.--Tree species presently or prospectively suitable for industrial wood products.

Cropland.--Land under cultivation within the past 24 months, including orchards and land in soil-improving crops, but excluding land cultivated in developing improved pasture. Also includes idle farmland.

Desirable trees.--Growing-stock trees of commercial species having no serious defects in quality limiting present or prospective use for timber products, of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age.

Diameter class.--A classification of trees based on diameter outside bark, measured at breast height ($4\frac{1}{2}$ feet above the ground). D.b.h. is the common abbreviation for "diameter at breast height." Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h., inclusive.

Farm.--Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totaled $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for the year amounted to at least $250.

Farm operator.--A person who operates a farm, either doing the work himself or directly supervising the work.

Farmer-owned lands.--Lands owned by farm operators.

Forest industry lands.--Lands owned by companies or individuals operating wood-using plants.

Forest land.--Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest type.--A classification of forest land based upon the species forming a plurality of live-tree stocking.

Longleaf-slash pine.--Forests in which longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Loblolly-shortleaf pine.--Forests in which loblolly pine, shortleaf pine, or other southern yellow pines, except longleaf or slash pine, singly or in combination, comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Oak-pine.--Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.--Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-gum-cypress.--Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprises a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood.--Forests in which elm, ash, or cottonwood, singly or in combination, comprises a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Gross growth.--Annual increase in net volume of trees in the absence of cutting and mortality.

Growing-stock trees.--Live trees of commercial species qualifying as desirable or acceptable trees.

Growing-stock volume.--Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. (Net volume in primary forks is included.)

Hardwoods.--Dicotyledonous trees, usually broad-leaved and deciduous.

Soft hardwoods.--Soft-textured hardwoods such as boxelder, red and silver maple, buckeye, hackberry, loblolly-bay, silverbell (in mts.), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm.

Hard hardwoods.--Hard-textured hardwoods such as Florida and sugar maple, birch, hickory, dogwood, persimmon (forest grown), beech, ash, honeylocust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Idle farmland.--Includes former croplands, orchards, improved pastures and farm sites not tended within the past two years, and presently less than 16.7 percent stocked with trees.

Improved pasture.--Land currently improved for grazing by cultivation, seeding, irrigation, or clearing of trees or brush.

Industrial wood.--All roundwood products except fuelwood.

Land area.--The area of dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area.

Logging residues.--The unused portions of trees cut or killed by logging.

Miscellaneous Federal lands.--Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

Miscellaneous private lands - corporate.--Lands owned by private corporations other than forest industry.

Miscellaneous private lands - individual.--Privately owned lands other than forest-industry, farmer-owned, or corporate lands.

Mortality.--Number or sound-wood volume of live trees dying from natural causes during a specified period.

National Forest land.--Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Net annual growth.--The increase in volume for a specific year.

Net volume.--Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial forest land.--(a) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and (b) productive-reserved forest land.

Noncommercial species.--Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land.--Land that has never supported forests and lands formerly forested where timber management is precluded by development for other uses.

Nonstocked land.--Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Other Federal lands.--Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

Other public lands.--Publicly-owned lands other than National Forests.

Overstocked areas.--Areas where growth of trees is significantly reduced by excessive numbers of trees.

Poletimber trees.--Growing-stock trees of commercial species at least 5.0 inches in d.b.h. but smaller than sawtimber size.

Productive-reserved forest land.--Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation.

Rangeland.--Land on which the natural plant cover is composed principally of native grasses, forbs, or shrubs valuable for forage.

Rotten trees.--Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively, primarily because of rot or missing sections, and with less than one-third of the gross tree volume in sound material.

Rough trees.--(a) Live trees of commercial species that do not contain at least one 12-foot saw log now or prospectively, primarily because of roughness, poor form, splits, and cracks, and with less than one-third of the gross tree volume in sound material, and (b) all live trees of noncommercial species.

Salvable dead trees.--Standing or down dead trees that are considered merchantable by Forest Survey standards.

Saplings.--Live trees 1.0 inch to 5.0 inches in diameter at breast height.

Saw log.--A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, and with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods).

Saw-log portion.--That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.--The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber trees.--Live trees of commercial species containing at least a 12-foot saw log and with at least one-third of the gross board-foot volume between the 1-foot stump and minimum saw-log top sound. Softwoods must be at least 9.0 inches and hardwoods at least 11.0 inches in diameter at breast height.

Sawtimber volume.--Net volume of the saw-log portion of live sawtimber in board-foot International 1/4-inch rule.

Seedlings.--Live trees less than 1.0 inch in diameter at breast height that are expected to survive and develop.

Site class.--A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Class 1.--Sites capable of producing 165 or more cubic feet per acre annually.

Class 2.--Sites capable of producing 120 to 165 cubic feet per acre annually.

Class 3.--Sites capable of producing 85 to 120 cubic feet per acre annually.

Class 4.--Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 5.--Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

Softwoods.--Coniferous trees, usually evergreen, having needles or scale-like leaves.

Pines.--Yellow pine species which include loblolly, longleaf, slash, shortleaf, pitch, Virginia, Table-Mt., sand, and spruce pine.

Other softwoods.--White pine, hemlock, cypress, eastern redcedar, white-cedar, spruce, and fir.

Stand-size class.--A classification of forest land based on the size class of growing-stock trees on the area.

Sawtimber stands.--Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.--Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.--Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and seedlings.

State, county, and municipal lands.--Lands owned by States, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Stocking.--The degree of occupancy of land by trees, measured by basal area or the number of trees in a stand and spacing in the stand, compared to a minimum standard, depending on tree size, to fully utilize the growth potential of the land. (See page 12.)

Timber removals.--The net volume of growing-stock trees removed from the inventory by harvesting; cultural operations, such as stand improvement; land clearing, or changes in land use.

Unproductive forest land.--Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

Upper-stem portion.--That part of the main stem or fork of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

Urban and other areas.--Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

Stocking standard

D.b.h. class	Minimum number of trees per acre for full stocking	Minimum basal area per acre for full stocking	Percent stocking assigned each tally tree 1/
Seedlings	600	--	5.0
2	560	--	5.4
4	460	--	6.5
6	340	67	5.8
8	240	84	4.8
10	155	85	4.3
12	115	90	4.0
14	90	96	3.8
16	72	101	3.7
18	60	106	3.5
20	51	111	3.5

1/ Trees less than 5.0 inches d.b.h. were tallied on a 10-point cluster of circular, 1/300-acre plots at each sample location. Trees 5.0 inches d.b.h. and larger were tallied on a 10-point cluster of variable plots using a basal area factor of 37.5 at each sample location.

Overstocked--Over 130 percent
Fully stocked--100-130 percent
Medium stocked--60-99 percent
Poorly stocked--16.7-59 percent
Nonstocked--Less than 16.7 percent

Cubic feet of wood per average cord
(excluding bark)

D.b.h. class	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
6	61.6	61.1	68.3	60.1	60.1
8	69.3	68.1	76.2	68.5	68.3
10	74.3	73.0	81.4	73.4	73.3
12	77.8	76.6	85.2	76.3	76.3
14	80.2	79.3	88.0	78.4	78.4
16	81.5	81.4	90.3	79.7	79.8
18	82.7	83.2	92.2	80.8	80.8
20	83.1	84.6	93.6	81.4	81.5
22	83.5	85.8	95.0	82.1	82.1
24+	85.0	87.4	99.5	83.0	83.6
Average	79.1	75.7	87.4	78.0	80.2

COUNTY TABLES

The county tables are intended for use in compiling forest resource estimates for groups of counties. Because the sampling procedure used by the Forest Survey in Northeast Florida was intended primarily to furnish inventory data for the Unit as a whole, individual county estimates have limited and variable accuracy. As county totals are broken down by various subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase can be computed with the formula on page 5.

Table 1.--Area, by land class and county, 1970

County	All land[1]	Forest land				Nonforest land[2]
		Total	Commercial forest	Unproductive forest	Productive reserved	
	Thousand acres					
Alachua	588.2	311.4	311.0	--	0.4	276.8
Baker	375.0	350.6	349.5	--	1.1	24.4
Bradford	188.5	148.1	148.1	--	--	40.4
Clay	392.7	327.5	326.2	--	1.3	65.2
Columbia	515.3	389.4	385.2	3.0	1.2	125.9
Dixie	456.7	393.6	393.6	--	(3/)	63.1
Duval	508.0	290.8	290.2	--	0.6	217.2
Flagler	316.1	265.6	263.6	1.8	0.2	50.5
Gilchrist	227.0	150.8	150.8	--	--	76.2
Hamilton	329.0	253.3	252.2	--	1.1	75.7
Lafayette	352.0	294.9	294.7	0.2	--	57.1
Levy	729.5	521.7	507.9	12.0	1.8	207.8
Madison	456.8	323.9	323.9	--	(3/)	132.9
Marion	1,038.3	637.6	636.1	--	1.5	400.7
Nassau	417.1	345.6	342.6	2.0	1.0	71.5
Putnam	473.9	369.4	368.7	--	0.7	104.5
St. Johns	400.9	298.1	293.4	3.1	1.6	102.8
Suwannee	439.1	204.8	204.2	--	0.6	234.3
Taylor	668.2	611.5	607.0	4.5	(3/)	56.7
Union	158.0	133.8	133.8	--	--	24.2
Volusia	723.2	491.3	478.2	12.4	0.7	231.9
Total	9,753.5	7,113.7	7,060.9	39.0	13.8	2,639.8

1/ From U. S. Bureau of the Census, Land and Water Area of the United States, 1960.

2/ Includes 118,900 acres of water according to Survey standards of area classification but defined by the Bureau of the Census as land.

3/ Less than 50 acres.

Table 2.--Area of commercial forest land, by ownership and county, 1970

County	All ownerships	Ownership class							
		National Forest	Miscellaneous Federal	State	County and municipal	Forest industry[2]	Farmer	Miscellaneous private	
								Corporate	Individual
	Thousand acres								
Alachua	311.0	--	--	6.7	0.4	111.1	96.4	35.5	60.9
Baker	349.5	74.6	--	0.1	--	165.7	10.9	40.0	58.2
Bradford	148.1	--	--	8.4	1.1	73.4	21.7	10.9	32.6
Clay	326.2	--	0.7	53.6	0.8	89.7	92.7	4.0	84.7
Columbia	385.2	73.0	--	(1/)	0.3	121.6	97.6	43.9	48.8
Dixie	393.6	--	--	0.4	0.3	385.0	1.3	1.3	5.3
Duval	290.2	--	14.1	3.7	1.6	39.9	16.8	12.6	201.5
Flagler	263.6	--	--	0.1	0.4	184.5	16.7	--	61.9
Gilchrist	150.8	--	--	0.1	0.3	56.8	50.4	14.4	28.8
Hamilton	252.2	--	--	(1/)	--	143.9	22.8	--	85.5
Lafayette	294.7	--	--	--	0.4	222.4	27.8	14.0	30.1
Levy	507.9	--	--	1.6	0.2	305.5	59.5	50.2	90.9
Madison	323.9	--	--	(1/)	--	158.6	122.0	--	43.3
Marion	636.1	248.6	1.9	12.5	0.8	59.1	113.1	130.5	69.6
Nassau	342.6	--	--	2.9	0.6	193.5	7.3	10.9	127.4
Putnam	368.7	22.8	0.3	4.8	0.2	103.5	94.8	29.2	113.1
St. Johns	293.4	--	--	0.2	0.4	140.5	43.1	28.7	80.5
Suwannee	204.2	--	--	--	0.1	29.6	90.7	7.0	76.8
Taylor	607.0	--	--	0.1	0.3	502.9	8.7	25.9	69.1
Union	133.8	--	(1/)	5.1	--	76.5	48.2	--	4.0
Volusia	478.2	--	8.8	2.8	0.8	100.0	68.0	123.0	174.8
Total	7,060.9	419.0	25.8	103.1	9.0	3,263.7	1,110.5	582.0	1,547.8

1/ Less than 50 acres.
2/ Not including 385,000 acres of farmer-owned and miscellaneous private lands leased to forest industry.

Table 3.--Area of commercial forest land, by forest-type group and county, 1970

County	All type groups	Forest-type groups					
		Longleaf-slash pine	Loblolly-shortleaf pine	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood
	Thousand acres						
Alachua	311.0	141.7	20.3	32.4	74.4	42.2	--
Baker	349.5	250.0	8.2	24.4	--	66.9	--
Bradford	148.1	114.3	--	10.8	10.9	12.1	--
Clay	326.2	149.3	29.5	18.7	64.4	64.3	--
Columbia	385.2	194.7	9.8	26.5	56.1	98.1	--
Dixie	393.6	166.2	4.2	34.4	55.0	133.1	0.7
Duval	290.2	144.9	23.1	25.2	50.4	46.6	--
Flagler	263.6	176.3	--	25.5	8.1	53.7	--
Gilchrist	150.8	88.7	--	3.6	51.3	7.2	--
Hamilton	252.2	151.4	2.8	33.6	8.6	55.8	--
Lafayette	294.7	144.1	7.2	30.9	26.3	86.2	--
Levy	507.9	185.7	16.4	54.2	103.9	143.3	4.4
Madison	323.9	108.3	24.3	53.3	47.6	90.4	--
Marion	636.1	127.1	240.6	72.7	144.0	47.4	4.3
Nassau	342.6	170.8	23.1	45.8	--	102.9	--
Putnam	368.7	174.9	38.2	23.6	97.0	35.0	--
St. Johns	293.4	173.6	14.4	28.4	8.6	68.4	--
Suwannee	204.2	76.8	16.8	24.4	51.9	34.3	--
Taylor	607.0	280.5	47.4	54.5	32.2	192.4	--
Union	133.8	88.8	--	14.5	12.0	18.5	--
Volusia	478.2	187.8	67.4	41.2	16.2	165.6	--
Total	7,060.9	3,295.9	593.7	678.6	918.9	1,564.4	9.4

Table 4.--Area of commercial forest land, by stand-size class and county, 1970

County	All stands	Stand-size class			Nonstocked areas
		Sawtimber	Poletimber	Sapling and seedling	
	Thousand acres				
Alachua	311.0	103.0	92.9	81.0	34.1
Baker	349.5	132.3	58.1	137.0	22.1
Bradford	148.1	20.8	66.8	55.1	5.4
Clay	326.2	70.2	72.1	83.7	100.2
Columbia	385.2	102.2	131.6	122.5	28.9
Dixie	393.6	127.5	126.1	100.0	40.0
Duval	290.2	73.9	81.2	93.1	42.0
Flagler	263.6	85.3	61.8	101.2	15.3
Gilchrist	150.8	36.4	36.6	52.3	25.5
Hamilton	252.2	69.5	68.3	99.6	14.8
Lafayette	294.7	81.8	54.5	105.8	52.6
Levy	507.9	201.9	141.8	89.5	74.7
Madison	323.9	93.7	103.0	94.7	32.5
Marion	636.1	184.1	171.1	161.3	119.6
Nassau	342.6	87.0	118.1	118.7	18.8
Putnam	368.7	68.8	82.3	123.2	94.4
St. Johns	293.4	62.7	98.4	129.4	2.9
Suwannee	204.2	51.7	51.8	56.0	44.7
Taylor	607.0	221.5	110.5	214.5	60.5
Union	133.8	34.5	44.4	50.9	4.0
Volusia	478.2	170.7	82.4	151.6	73.5
Total	7,060.9	2,079.5	1,853.8	2,221.1	906.5

Table 5.--Area of commercial forest land, by site class and county, 1970

County	All classes	Site class				
		1	2	3	4	5
	Thousand acres					
Alachua	311.0	--	15.2	98.0	180.9	16.9
Baker	349.5	--	--	86.5	249.5	13.5
Bradford	148.1	--	5.4	35.1	102.2	5.4
Clay	326.2	--	--	36.1	214.2	75.9
Columbia	385.2	--	4.9	128.5	214.9	36.9
Dixie	393.6	--	--	113.7	248.2	31.7
Duval	290.2	--	--	29.4	197.8	63.0
Flagler	263.6	--	5.8	40.8	208.9	8.1
Gilchrist	150.8	--	--	14.8	96.0	40.0
Hamilton	252.2	--	--	47.8	177.6	26.8
Lafayette	294.7	--	--	42.9	189.3	62.5
Levy	507.9	--	--	90.9	324.6	92.4
Madison	323.9	--	3.9	52.6	238.4	29.0
Marion	636.1	--	20.7	141.4	296.0	178.0
Nassau	342.6	--	--	68.5	255.6	18.5
Putnam	368.7	--	--	73.6	184.1	111.0
St. Johns	293.4	--	--	109.4	175.4	8.6
Suwannee	204.2	--	--	20.9	151.9	31.4
Taylor	607.0	--	4.5	177.2	341.0	84.3
Union	133.8	--	4.0	68.2	53.0	8.6
Volusia	478.2	--	3.3	47.6	345.9	81.4
Total	7,060.9	--	67.7	1,523.9	4,445.4	1,023.9

Table 6.--Area of commercial forest land, by stocking classes of growing-stock trees, by county, 1970

County	All classes	Stocking percentage[1/]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
Alachua	311.0	10.1	33.8	131.7	101.3	34.1
Baker	349.5	6.6	56.8	203.1	60.9	22.1
Bradford	148.1	3.4	34.2	78.8	26.3	5.4
Clay	326.2	--	32.0	103.5	90.5	100.2
Columbia	385.2	15.3	68.9	143.3	128.8	28.9
Dixie	393.6	16.6	62.7	191.7	82.6	40.0
Duval	290.2	5.3	53.9	104.3	84.7	42.0
Flagler	263.6	11.5	65.2	115.1	56.5	15.3
Gilchrist	150.8	3.8	22.0	47.9	51.6	25.5
Hamilton	252.2	--	42.1	117.9	77.4	14.8
Lafayette	294.7	7.2	53.0	79.1	102.8	52.6
Levy	507.9	18.3	37.8	216.3	160.8	74.7
Madison	323.9	--	57.2	122.7	111.5	32.5
Marion	636.1	3.3	113.1	179.2	220.9	119.6
Nassau	342.6	7.9	46.2	175.5	94.2	18.8
Putnam	368.7	4.7	25.5	149.2	94.9	94.4
St. Johns	293.4	5.7	78.9	146.2	59.7	2.9
Suwannee	204.2	3.5	31.4	68.6	56.0	44.7
Taylor	607.0	8.9	90.7	243.2	203.7	60.5
Union	133.8	--	35.8	74.4	19.6	4.0
Volusia	478.2	20.8	78.7	132.8	172.4	73.5
Total	7,060.9	152.9	1,119.9	2,824.5	2,057.1	906.5

1/ See stocking standards on page 12.

Table 7.--Volume of sawtimber and growing stock on commercial forest land, by species group and county, 1970

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet 1/				
Alachua	586.3	229.1	90.1	114.4	152.7	206.4	95.4	27.4	40.7	43.0
Baker	893.8	630.5	112.4	150.1	0.8	315.2	222.8	37.6	54.3	0.5
Bradford	227.8	201.8	8.9	2.0	15.1	109.9	91.1	9.9	3.1	5.8
Clay	340.9	154.0	59.2	66.1	61.6	146.9	79.7	18.9	27.9	20.4
Columbia	857.5	527.3	178.3	85.1	66.8	318.5	178.2	57.3	57.2	25.8
Dixie	998.8	313.5	191.4	204.2	289.7	346.5	107.6	64.2	83.7	91.0
Duval	552.1	248.9	20.5	171.2	111.5	217.2	111.3	9.8	59.3	36.8
Flagler	770.9	316.2	235.3	119.6	99.8	253.4	120.1	71.7	39.6	22.0
Gilchrist	120.3	41.2	23.2	11.5	44.4	58.5	33.9	8.6	2.9	13.1
Hamilton	381.9	202.6	85.6	59.9	33.8	157.0	77.5	32.1	35.5	11.9
Lafayette	426.3	211.8	103.9	65.0	45.6	157.9	76.3	38.0	29.0	14.6
Levy	1,099.9	481.8	159.9	192.7	265.5	385.6	151.0	60.3	87.3	87.0
Madison	578.2	247.1	114.1	156.5	60.5	229.0	96.2	39.2	68.7	24.9
Marion	1,221.1	801.2	61.9	175.0	183.0	421.5	290.0	16.8	52.9	61.8
Nassau	724.7	445.9	47.8	141.9	89.1	296.6	183.3	20.0	57.8	35.5
Putnam	520.1	288.1	36.2	119.3	76.5	186.2	112.1	8.7	40.3	25.1
St. Johns	639.6	293.8	95.6	109.6	140.6	251.9	111.5	34.2	57.6	48.6
Suwannee	282.2	112.4	12.2	68.4	89.2	94.4	40.7	2.9	21.2	29.6
Taylor	1,287.3	588.9	276.0	218.7	203.7	432.5	174.7	81.8	92.8	83.2
Union	295.9	141.0	27.3	44.7	12.9	113.1	63.1	13.9	33.1	3.0
Volusia	972.2	417.8	334.7	147.0	72.7	342.5	145.5	120.9	55.4	20.7
Total	13,707.8	6,894.9	2,274.5	2,422.9	2,115.5	5,040.7	2,568.0	774.2	907.3	791.

1/ Factors for converting to cords are shown on page 12.

Table 8.--Net annual growth of sawtimber and growing stock on commercial forest land, by species group and county, 1969

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Alachua	30.0	21.2	2.3	2.6	3.9	12.8	9.9	0.6	1.2	1.1
Baker	59.6	52.4	3.1	4.1	--	15.4	13.6	0.9	0.9	--
Bradford	18.9	18.2	0.3	0.1	0.3	8.0	7.2	0.5	0.1	0.2
Clay	21.6	16.4	1.1	2.7	1.4	8.8	7.3	0.4	0.6	0.5
Columbia	48.6	38.7	4.6	3.3	2.0	17.1	12.2	1.2	2.4	1.3
Dixie	57.4	36.3	5.9	7.0	8.2	16.2	8.9	1.6	2.8	2.9
Duval	28.8	21.8	0.6	3.2	3.2	12.8	10.0	0.2	1.4	1.2
Flagler	42.5	32.9	6.0	2.5	1.1	14.1	11.1	1.9	0.8	0.3
Gilchrist	6.9	4.2	0.8	0.2	1.7	6.1	5.5	0.2	0.1	0.3
Hamilton	24.1	18.8	2.1	1.9	1.3	7.5	5.6	0.6	0.9	0.4
Lafayette	25.0	18.1	2.9	2.4	1.6	8.1	5.8	1.0	0.9	0.4
Levy	58.3	38.8	5.7	6.3	7.5	20.4	13.5	1.5	2.5	2.9
Madison	33.4	21.9	3.0	5.7	2.8	10.8	7.7	0.7	1.6	0.8
Marion	75.8	65.1	1.4	3.9	5.4	25.4	21.5	0.3	1.3	2.3
Nassau	50.7	43.2	1.5	3.1	2.9	17.4	14.6	0.4	1.4	1.0
Putnam	36.0	29.8	1.2	3.2	1.8	12.2	10.4	0.3	0.9	0.6
St. Johns	37.1	28.1	2.8	3.0	3.2	15.1	11.5	0.7	1.7	1.2
Suwannee	9.7	6.1	0.4	1.4	1.8	5.6	4.7	--	0.4	0.5
Taylor	67.1	42.9	7.1	8.6	8.5	21.1	13.6	2.0	2.6	2.9
Union	16.9	14.5	1.0	1.1	0.3	7.2	5.9	0.4	0.8	0.1
Volusia	49.1	36.2	8.5	2.9	1.5	15.6	11.4	2.6	1.2	0.4
Total	797.5	605.6	62.3	69.2	60.4	277.7	211.9	18.0	26.5	21.3

Table 9.--Annual removals of sawtimber and growing stock on commercial forest land, by species group and county, 1969

County	Sawtimber					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet					Million cubic feet				
Alachua	25.3	22.8	--	0.5	2.0	7.5	6.6	--	0.4	0.5
Baker	33.2	33.2	--	--	--	10.6	10.6	--	--	--
Bradford	19.3	18.7	--	--	0.6	6.2	6.0	--	--	0.2
Clay	13.5	13.5	--	--	--	6.5	6.5	--	--	--
Columbia	30.0	27.9	--	0.7	1.4	10.0	9.3	--	0.2	0.5
Dixie	40.1	26.4	2.0	2.6	9.1	12.0	8.6	1.0	0.5	1.9
Duval	12.8	6.6	--	1.4	4.8	4.5	2.8	--	0.4	1.3
Flagler	44.6	32.7	7.7	0.8	3.4	12.1	9.3	1.7	0.3	0.8
Gilchrist	7.5	--	2.9	0.5	4.1	1.7	--	0.7	0.1	0.9
Hamilton	45.0	41.4	--	3.2	0.4	12.2	10.7	--	0.9	0.6
Lafayette	39.5	31.5	3.0	2.9	2.1	13.0	10.7	0.7	0.9	0.7
Levy	34.8	29.5	0.7	2.1	2.5	8.5	7.0	0.2	0.4	0.9
Madison	34.5	28.5	0.8	3.8	1.4	9.5	7.4	0.2	1.1	0.8
Marion	61.7	52.9	0.9	4.1	3.8	17.5	14.8	0.2	1.1	1.4
Nassau	19.5	14.3	--	3.3	1.9	8.4	6.3	--	1.3	0.8
Putnam	22.0	14.0	--	4.5	3.5	7.3	4.6	--	1.3	1.4
St. Johns	47.8	41.1	0.2	2.6	3.9	11.9	9.9	0.2	0.8	1.0
Suwannee	9.9	7.3	--	2.6	--	3.1	2.3	--	0.7	0.1
Taylor	58.5	46.7	0.6	7.5	3.7	17.4	14.0	0.2	2.1	1.1
Union	11.5	6.7	0.6	2.7	1.5	3.4	2.1	0.1	0.8	0.4
Volusia	11.9	11.5	--	--	0.4	4.7	4.5	0.1	--	0.1
Total	622.9	507.2	19.4	45.8	50.5	188.0	154.0	5.3	13.3	15.4

Table 10.--Area of commercial forest land, by forest type and ownership class, 1970

Forest type	All ownerships	Ownership class				
		National Forest	Other public	Forest industry	Farmer	Misc. private
		Thousand acres				
Softwood types:						
Longleaf pine	455.5	58.7	25.1	143.4	71.8	156.5
Slash pine	2,840.4	89.9	35.9	1,607.2	351.4	756.0
Loblolly pine	145.1	--	--	54.4	30.1	60.6
Sand pine	275.2	192.2	19.4	11.0	10.8	41.8
Eastern redcedar	8.8	--	--	4.4	--	4.4
Pond pine	164.6	9.8	12.0	58.1	26.9	57.8
Total	3,889.6	350.6	92.4	1,878.5	491.0	1,077.1
Hardwood types:						
Oak-pine	678.6	32.6	7.1	300.7	170.5	167.7
Oak-hickory	478.9	--	7.5	141.6	169.2	160.6
Southern scrub oak	440.0	6.7	18.2	34.1	105.6	275.4
Oak-gum-cypress	1,564.4	29.1	12.7	904.4	174.2	444.0
Elm-ash-cottonwood	9.4	--	--	4.4	--	5.0
Total	3,171.3	68.4	45.5	1,385.2	619.5	1,052.7
All types	7,060.9	419.0	137.9	3,263.7	1,110.5	2,129.8

Table 11.--Area of commercial forest land, by ownership and stocking classes of growing-stock trees, 1970

Ownership classes	All classes	Stocking percentage[1/]				
		Over 130	100-130	60-99	16.7-59	Less than 16.7
	Thousand acres					
National Forest	419.0	16.7	68.5	184.6	126.0	23.2
Other public	137.9	5.3	5.1	29.6	61.1	36.8
Forest industry	3,263.7	81.5	606.3	1,459.1	881.7	235.1
Farmer	1,110.5	24.2	152.6	433.2	330.9	169.6
Misc. private	2,129.8	25.2	287.4	718.0	657.4	441.8
All ownerships	7,060.9	152.9	1,119.9	2,824.5	2,057.1	906.5

1/ See stocking standards on page 12.

Table 12.--Volume of timber on commercial forest land, by class and species group, 1970

Class of timber	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	- - - - - - Million cubic feet - - - - - -				
Sawtimber trees:					
Saw-log portion	2,786.6	1,394.5	462.9	487.4	441.8
Upper-stem portion	329.6	133.7	57.5	93.3	45.1
Total	3,116.2	1,528.2	520.4	580.7	486.9
Poletimber trees	1,924.5	1,039.8	253.8	416.6	214.3
All growing-stock trees	5,040.7	2,568.0	774.2	997.3	701.2
Rough trees:					
Sawtimber-size trees	221.9	5.9	7.9	55.4	152.7
Poletimber-size trees	336.7	14.4	13.9	103.8	204.6
Total	558.6	20.3	21.8	159.2	357.3
Rotten trees:					
Sawtimber-size trees	93.8	1.0	14.6	33.3	44.9
Poletimber-size trees	16.1	--	2.2	7.7	6.2
Total	109.9	1.0	16.8	41.0	51.1
Salvable dead trees:					
Sawtimber-size trees	6.7	4.6	1.0	--	1.1
Poletimber-size trees	0.7	--	0.7	--	--
Total	7.4	4.6	1.7	--	1.1
Total, all timber	5,716.6	2,593.9	814.5	1,197.5	1,110.7

Table 13.--Number of growing-stock trees on commercial forest land, by species and diameter class, 1970

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Thousand trees										
Softwood:											
Longleaf pine	46,621	12,568	11,321	11,703	7,427	2,688	701	148	55	10	--
Slash pine	282,831	172,048	62,251	26,569	12,860	5,753	2,369	667	249	65	--
Loblolly pine	19,272	6,224	4,137	3,275	2,349	1,440	1,012	474	203	158	--
Pond pine	12,650	5,219	3,348	1,765	1,297	610	198	161	40	12	--
Spruce pine	176	76	--	--	17	31	22	19	--	11	--
Sand pine	24,177	16,518	5,098	1,788	465	218	51	33	--	6	--
Baldcypress	11,081	4,274	2,769	1,405	1,121	655	342	269	143	100	3
Pondcypress	81,241	34,847	20,236	12,854	7,529	3,749	1,352	391	124	149	10
Atlantic white cedar	99	--	--	29	43	27	--	--	--	--	--
Eastern redcedar	1,630	1,023	303	121	132	40	11	--	--	--	--
Total softwoods	479,778	252,797	109,463	59,509	33,240	15,211	6,058	2,162	814	511	13
Hardwood:											
Select white oaks[1]	731	124	178	120	40	142	67	18	23	19	--
Select red oaks[2]	471	193	179	36	35	15	--	9	--	4	--
Other white oaks	5,581	1,202	786	623	412	628	474	438	330	535	153
Other red oaks	34,481	13,704	8,320	4,809	2,783	1,905	1,185	653	441	587	94
Hickory	4,964	1,655	1,153	743	551	471	170	76	64	78	3
Florida maple	289	59	--	79	78	55	--	--	14	4	--
Soft maple	12,645	4,165	3,953	2,063	943	627	477	160	121	127	9
Beech	34	--	--	--	--	15	10	9	--	--	--
Sweetgum	22,282	10,462	5,216	3,266	1,628	899	431	171	131	75	3
Tupelo and blackgum	50,696	20,669	12,109	6,942	5,073	2,943	1,448	687	416	371	38
Ash	12,340	5,576	3,207	1,593	897	486	319	127	112	20	3
Loblolly-bay	7,420	3,852	1,865	999	277	110	172	82	33	24	6
Basswood	1,448	505	449	117	187	114	21	43	6	6	--
Yellow-poplar	252	84	38	58	22	29	12	9	--	--	--
Magnolia	1,625	214	467	334	253	143	135	28	26	25	--
Elm	3,384	1,417	648	570	425	150	87	60	14	10	3
Black cherry	129	--	54	31	--	13	22	9	--	--	--
Sweetbay	7,464	2,466	1,808	1,074	706	502	482	210	129	84	3
River birch	162	84	--	29	35	--	--	8	6	--	--
Hackberry	673	426	57	105	76	--	--	9	--	--	--
Other eastern hardwoods	1,282	697	260	200	56	59	--	7	--	3	--
Total hardwoods	168,353	67,554	40,747	23,791	14,477	9,306	5,512	2,813	1,866	1,972	315
All species	648,131	320,351	150,210	83,300	47,717	24,517	11,570	4,975	2,680	2,483	328

1/ Includes white and swamp chestnut oaks.
2/ Includes cherrybark and Shumard oaks.

Table 14.--Volume of all live trees on commercial forest land, by species and diameter class, 1970

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	511.9	36.7	80.5	150.1	142.7	69.3	22.5	6.5	2.9	0.7	--
Slash pine	1,588.2	390.1	378.7	313.6	235.2	147.1	75.3	29.8	13.1	5.3	--
Loblolly pine	245.3	14.8	27.2	38.5	44.9	37.0	35.3	22.3	12.2	13.1	--
Pond pine	99.1	11.2	17.0	19.0	20.4	15.1	6.6	6.6	2.5	0.7	--
Spruce pine	4.3	0.2	--	--	0.4	0.9	0.9	1.0	--	0.9	--
Sand pine	140.5	59.0	38.8	24.5	8.9	5.6	1.5	1.8	--	0.4	--
Baldcypress	147.0	15.5	21.6	18.5	24.2	18.8	12.2	13.4	8.8	9.4	4.6
Pondcypress	655.2	101.3	127.4	139.7	124.6	88.2	38.5	16.1	6.3	11.0	2.1
Atlantic white cedar	1.9	0.1	--	0.3	0.6	0.9	--	--	--	--	--
Eastern redcedar	8.7	2.4	1.6	1.3	1.8	1.0	0.4	--	0.2	--	--
Total softwoods	3,402.1	631.3	692.8	705.5	603.7	383.9	193.2	97.5	46.0	41.5	6.7
Hardwood:											
Select white oaks[1/]	13.1	0.6	0.9	1.1	0.8	3.8	2.1	0.8	1.2	1.8	--
Select red oaks[2/]	3.8	0.7	1.3	0.4	0.5	0.3	--	0.2	--	0.4	--
Other white oaks	266.6	12.0	14.3	20.8	23.1	26.2	25.4	26.4	21.4	59.8	37.2
Other red oaks	459.4	45.8	56.7	61.4	51.8	54.2	43.0	33.9	28.3	64.1	20.2
Hickory	61.3	4.7	6.9	7.4	9.3	12.7	6.4	4.0	3.1	6.3	0.5
Florida maple	6.0	0.2	0.3	1.1	1.6	1.6	--	--	0.8	0.4	--
Soft maple	171.0	19.0	30.3	30.2	24.4	21.2	18.5	9.0	6.2	11.0	1.2
Beech	1.4	--	--	0.2	--	0.4	0.5	0.3	--	--	--
Sweetgum	191.2	26.4	31.1	38.3	30.1	27.6	15.2	7.6	7.8	6.0	1.1
Tupelo and blackgum	573.0	69.6	79.6	86.4	102.6	86.0	52.1	31.2	24.6	34.7	6.2
Ash	145.1	23.4	28.6	23.2	19.8	18.4	14.2	7.9	6.6	2.6	0.4
Loblolly-bay	54.0	11.4	11.1	10.3	5.0	3.9	4.7	3.4	1.5	1.8	0.9
Basswood	18.9	1.6	3.6	1.9	3.8	3.6	1.0	2.5	0.4	0.5	--
Yellow-poplar	3.4	0.4	0.4	0.5	0.4	0.7	0.4	0.5	--	0.1	--
Magnolia	26.3	1.0	3.0	3.5	5.0	4.7	3.8	1.5	1.6	2.2	--
Elm	38.1	4.7	6.0	7.7	7.2	4.2	2.6	2.9	1.2	1.1	0.5
Black cherry	2.8	0.2	0.3	0.8	--	0.5	0.6	0.4	--	--	--
Sweetbay	108.5	10.8	14.1	15.5	13.5	15.5	15.3	9.9	6.3	6.9	0.7
River birch	2.1	0.4	--	0.1	0.8	0.2	--	0.3	0.3	--	--
Hackberry	5.7	1.7	0.9	1.6	1.1	--	--	0.4	--	--	--
Other eastern hardwoods	155.4	44.8	40.2	31.8	16.1	14.7	5.3	1.4	0.8	0.3	--
Total hardwoods	2,307.1	279.4	329.6	344.2	316.9	300.4	211.1	144.5	112.1	200.0	68.9
All species	5,709.2	910.7	1,022.4	1,049.7	920.6	684.3	404.3	242.0	158.1	241.5	75.6

1/ Includes white and swamp chestnut oaks.
2/ Includes cherrybark and Shumard oaks.

Table 15.--Volume of growing stock on commercial forest land, by species and diameter class, 1970

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million cubic feet										
Softwood:											
Longleaf pine	510.4	36.0	80.3	149.8	142.7	69.3	22.5	6.5	2.6	0.7	--
Slash pine	1,579.5	386.2	376.4	312.9	233.9	146.8	75.3	29.8	13.1	5.1	--
Loblolly pine	242.2	13.8	26.2	37.9	44.7	37.0	35.3	22.0	12.2	13.1	--
Pond pine	96.2	10.3	16.3	18.3	20.3	14.6	6.6	6.6	2.5	0.7	--
Spruce pine	4.3	0.2	--	--	0.4	0.9	0.9	1.0	--	0.9	--
Sand pine	135.4	55.9	38.2	23.1	8.9	5.6	1.5	1.8	--	0.4	--
Baldcypress	138.8	14.8	20.7	17.9	23.7	18.3	12.2	13.0	8.1	8.7	1.4
Pondcypress	625.7	93.4	121.2	135.1	122.6	84.8	37.4	14.8	5.4	9.8	1.2
Atlantic white cedar	1.8	--	--	0.3	0.6	0.9	--	--	--	--	--
Eastern redcedar	7.9	2.1	1.6	1.1	1.8	0.9	0.4	--	--	--	--
Total softwoods	3,342.2	612.7	680.9	696.4	599.6	379.1	192.1	95.5	43.9	39.4	2.6
Hardwood:											
Select white oaks[1/]	12.5	0.4	0.9	1.1	0.6	3.6	2.1	0.8	1.2	1.8	--
Select red oaks[2/]	3.8	0.7	1.3	0.4	0.5	0.3	--	0.2	--	0.4	--
Other white oaks	136.3	2.5	3.6	5.6	5.6	13.2	12.2	15.2	14.4	37.3	26.7
Other red oaks	373.1	33.4	45.0	49.7	44.7	46.8	37.2	27.8	22.4	49.6	16.5
Hickory	56.2	4.0	5.5	7.4	8.8	12.0	5.5	3.7	3.1	5.7	0.5
Florida maple	5.0	0.2	--	0.8	1.2	1.6	--	--	0.8	0.4	--
Soft maple	127.2	12.0	23.6	22.7	15.4	16.1	15.0	6.9	5.5	8.8	1.2
Beech	1.2	--	--	--	--	0.4	0.5	0.3	--	--	--
Sweetgum	172.5	21.9	28.1	34.5	27.7	25.1	14.6	7.3	7.2	5.7	0.4
Tupelo and blackgum	487.5	52.7	65.5	73.1	86.8	77.8	46.7	28.9	22.2	28.9	4.9
Ash	106.1	13.4	18.7	16.3	17.4	14.9	10.9	6.3	6.4	1.6	0.2
Loblolly-bay	42.7	8.1	8.0	8.2	4.1	2.4	4.3	3.4	1.5	1.8	0.9
Basswood	15.4	1.3	3.0	1.3	3.3	2.9	0.7	2.0	0.4	0.5	--
Yellow-poplar	2.9	0.2	0.2	0.5	0.4	0.7	0.4	0.5	--	--	--
Magnolia	22.2	0.5	2.4	3.1	3.9	3.7	3.8	1.1	1.5	2.2	--
Elm	31.3	3.2	4.1	5.7	7.0	3.6	2.6	2.9	0.9	0.8	0.5
Black cherry	1.7	--	0.2	0.2	--	0.3	0.6	0.4	--	--	--
Sweetbay	88.0	6.1	10.8	11.4	11.2	13.4	14.5	8.4	5.8	6.0	0.4
River birch	1.4	0.2	--	0.1	0.5	--	--	0.3	0.3	--	--
Hackberry	4.1	1.1	0.2	1.3	1.1	--	--	0.4	--	--	--
Other eastern hardwoods	7.4	1.7	0.9	1.9	0.8	1.5	--	0.3	--	0.3	--
Total hardwoods	1,698.5	163.6	222.0	245.3	241.0	240.3	171.6	117.1	93.6	151.8	52.2
All species	5,040.7	776.3	902.9	941.7	840.6	619.4	363.7	212.6	137.5	191.2	54.8

1/ Includes white and swamp chestnut oaks.
2/ Includes cherrybark and Shumard oaks.

Table 16.--Volume of sawtimber on commercial forest land, by species and diameter class, 1970

Species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	1,832.2	608.5	673.0	363.1	135.1	38.4	11.4	2.7	--
Slash pine	3,603.1	1,136.9	1,034.4	742.9	427.4	176.1	59.7	25.7	--
Loblolly pine	968.8	136.2	194.6	183.8	201.3	126.4	57.7	68.8	--
Pond pine	303.0	58.6	82.4	70.0	40.4	36.4	11.9	3.3	--
Spruce pine	21.2	--	1.7	5.0	5.2	4.6	--	4.7	--
Sand pine	166.6	85.8	35.5	24.9	7.4	10.7	--	2.3	--
Baldcypress	496.2	59.9	107.0	90.2	70.9	79.1	37.8	44.6	6.7
Pondcypress	1,755.0	472.7	517.5	409.2	200.3	82.2	24.5	43.5	5.1
Atlantic white cedar	6.7	0.9	1.9	3.9	--	--	--	--	--
Eastern redcedar	16.6	3.7	7.3	3.8	1.8	--	--	--	--
Total softwoods	9,169.4	2,563.2	2,655.3	1,896.8	1,089.8	553.9	203.0	195.6	11.8
Hardwood:									
Select white oaks[1/]	44.6	--	1.3	14.3	10.4	3.5	5.6	9.5	--
Select red oaks[2/]	6.4	--	1.8	1.3	--	1.5	--	1.8	--
Other white oaks	542.7	--	15.8	45.7	44.2	67.6	64.5	176.5	128.4
Other red oaks	1,066.0	--	162.4	178.7	154.9	135.5	101.4	250.9	82.2
Hickory	175.3	--	34.2	47.6	25.1	19.4	13.9	31.3	3.8
Florida maple	17.6	--	5.2	7.6	--	--	3.4	1.4	--
Soft maple	312.1	--	54.6	67.9	69.1	36.2	26.0	50.5	7.8
Beech	4.9	--	--	1.4	1.4	2.1	--	--	--
Sweetgum	386.9	--	95.5	109.0	70.1	40.6	34.9	34.1	2.7
Tupelo and blackgum	1,220.3	--	270.0	307.6	194.6	152.7	109.6	158.3	27.5
Ash	242.2	--	58.5	60.3	50.5	29.8	33.0	9.1	1.0
Loblolly-bay	84.3	--	12.5	8.0	20.6	18.1	8.9	10.4	5.8
Basswood	42.6	--	12.1	12.0	3.7	9.8	2.5	2.5	--
Yellow-poplar	9.9	--	1.8	3.4	2.0	2.7	--	--	--
Magnolia	69.6	--	13.9	14.9	17.8	6.5	7.1	9.4	--
Elm	69.4	--	22.8	13.2	10.9	11.6	4.3	4.2	2.4
Black cherry	4.8	--	--	0.7	1.3	2.8	--	--	--
Sweetbay	216.0	--	30.4	45.1	52.1	37.5	22.8	26.9	1.2
River birch	4.9	--	2.2	--	--	1.3	1.4	--	--
Hackberry	6.2	--	4.3	--	--	1.9	--	--	--
Other eastern hardwoods	11.7	--	2.7	6.8	--	1.1	--	1.1	--
Total hardwoods	4,538.4	--	802.0	945.5	728.7	582.2	439.3	777.9	262.8
All species	13,707.8	2,563.2	3,457.3	2,842.3	1,818.5	1,136.1	642.3	973.5	274.6

1/ Includes white and swamp chestnut oaks.
2/ Includes cherrybark and Shumard oaks.

Table 17.--Net annual growth and removals of growing stock on commercial forest land, by species, 1969

Species	Net annual growth	Annual timber removals
	- - - - Million cubic feet - - - -	
Softwood:		
Yellow pines	211.9	154.0
Cypress	17.5	5.3
Other eastern softwoods	0.5	--
Total softwoods	229.9	159.3
Hardwood:		
Select white and red oaks	0.5	0.6
Other white and red oaks	16.3	10.8
Hickory	1.6	2.5
Hard maple	0.1	0.4
Sweetgum	5.7	4.0
Ash, walnut, and black cherry	2.7	0.9
Yellow-poplar	0.1	0.3
Other hardwoods	20.8	9.2
Total hardwoods	47.8	28.7
All species	277.7	188.0

Table 18.--Net annual growth and removals of sawtimber on commercial forest land, by species, 1969

Species	Net annual growth	Annual timber removals
	- - - - Million board feet - - - -	
Softwood:		
Yellow pines	605.6	507.2
Cypress	60.9	19.4
Other eastern softwoods	1.4	--
Total softwoods	667.9	526.6
Hardwood:		
Select white and red oaks	1.0	3.2
Other white and red oaks	46.8	35.1
Hickory	5.7	9.3
Hard maple	0.4	1.5
Sweetgum	15.0	14.2
Ash, walnut, and black cherry	6.0	1.4
Yellow-poplar	0.3	1.6
Other hardwoods	54.4	30.0
Total hardwoods	129.6	96.3
All species	797.5	622.9

Table 19.--Mortality of growing stock and sawtimber on commercial forest land, by species, 1969

Species	Growing stock	Sawtimber
	Million cubic feet	Million board feet
Softwood:		
Yellow pines	8.7	22.5
Cypress	1.9	6.0
Other eastern softwoods	0.2	0.9
Total softwoods	10.8	29.4
Hardwood:		
Select white and red oaks	0.2	1.1
Other white and red oaks	7.8	26.9
Hickory	--	--
Hard maple	--	--
Sweetgum	1.8	5.5
Ash, walnut, and black cherry	0.3	0.5
Yellow-poplar	--	--
Other hardwoods	7.3	19.6
Total hardwoods	17.4	53.6
All species	28.2	83.0

Table 20.--Volume of all live trees and growing stock on commercial forest land, by ownership class and species group, 1970

Ownership class	All live trees					Growing stock				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	466.7	350.5	36.6	61.9	17.7	445.2	346.7	35.6	54.5	8.4
Other public	50.5	31.7	3.0	11.6	4.2	44.7	30.7	2.8	10.6	0.6
Forest industry	2,463.5	1,033.0	461.1	553.8	415.6	2,230.4	1,028.3	444.5	461.5	296.1
Farmer	898.5	393.1	90.7	174.0	240.7	758.2	388.9	87.4	138.6	143.3
Miscellaneous private	1,830.0	781.0	221.4	396.2	431.4	1,562.2	773.4	203.9	332.1	252.8
All ownerships	5,709.2	2,589.3	812.8	1,197.5	1,109.6	5,040.7	2,568.0	774.2	997.3	701.2

Table 21.--Volume of sawtimber on commercial forest land, by ownership class and species group, 1970

Ownership class	Small sawtimber[1]					Large sawtimber[2]				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	965.1	830.2	71.2	58.3	5.4	245.6	87.0	55.8	88.7	14.1
Other public	99.5	76.9	6.0	16.6	--	38.7	19.4	2.1	14.3	2.9
Forest industry	4,054.9	2,210.2	1,028.2	533.3	283.2	1,924.0	513.3	293.2	522.7	594.8
Farmer	1,216.5	743.3	192.8	156.7	123.7	831.8	289.3	59.4	174.6	308.5
Miscellaneous private	2,526.8	1,576.7	379.8	335.5	234.8	1,804.9	548.6	186.0	522.2	548.1
All ownerships	8,862.8	5,437.3	1,678.0	1,100.4	647.1	4,845.0	1,457.6	596.5	1,322.5	1,468.4

1/ Volume of sawtimber trees less than 15.0 inches at d.b.h.
2/ Volume of sawtimber trees 15.0 inches and larger at d.b.h.

Table 22.--Net annual growth and removals of growing stock on commercial forest land, by ownership class and species group, 1969

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million cubic feet									
National Forest	24.5	22.5	0.6	1.1	0.3	6.9	6.9	--	--	--
Other public	2.2	1.8	0.1	0.3	--	4.2	2.3	--	0.5	1.4
Forest industry	123.1	90.5	10.5	12.8	9.3	90.0	76.5	2.4	5.9	5.2
Farmer	44.7	33.8	2.0	4.1	4.8	31.7	22.9	1.8	2.2	4.8
Miscellaneous private	83.2	63.3	4.8	8.2	6.9	55.2	45.4	1.1	4.7	4.0
All ownerships	277.7	211.9	18.0	26.5	21.3	188.0	154.0	5.3	13.3	15.4

Table 23.--Net annual growth and removals of sawtimber on commercial forest land, by ownership class and species group, 1969

Ownership class	Net annual growth					Annual timber removals				
	All species	Pine	Other softwood	Soft hardwood	Hard hardwood	All species	Pine	Other softwood	Soft hardwood	Hard hardwood
	Million board feet									
National Forest	74.9	68.0	2.5	3.7	0.7	14.7	14.7	--	--	--
Other public	7.7	7.1	0.2	0.4	--	14.5	9.4	--	1.3	3.8
Forest industry	345.5	247.5	37.8	34.7	25.5	296.9	249.3	7.0	22.5	18.1
Farmer	118.8	90.0	6.9	9.6	12.3	107.8	78.1	8.3	8.6	12.8
Miscellaneous private	250.6	193.0	14.9	20.8	21.9	189.0	155.7	4.1	13.4	15.8
All ownerships	797.5	605.6	62.3	69.2	60.4	622.9	507.2	19.4	45.8	50.5

Table 24.--Average net volume per acre of sawtimber, growing stock, and other live timber[1/] on commercial forest land, by ownership class, major forest type, and species group, 1970

Forest type, species group, and class of material	Ownership class											
	All ownerships		National Forest		Other public		Forest industry		Farmer		Misc. private	
	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet	Board feet	Cubic feet
Pine types:												
Growing stock:												
Softwood	1,406	569	2,123	805	1,169	392	1,300	535	1,306	575	1,364	541
Hardwood	33	17	12	10	--	--	18	13	33	19	62	26
Total	1,439	586	2,135	815	1,169	392	1,318	548	1,339	594	1,426	567
Other timber:												
Softwood	--	6	--	9	--	16	--	3	--	6	--	7
Hardwood	--	12	--	9	--	7	--	9	--	15	--	17
Total	--	18	--	18	--	23	--	12	--	21	--	24
Oak-pine type:												
Growing stock:												
Softwood	1,826	558	2,126	642	340	80	2,084	663	1,604	451	1,650	509
Hardwood	405	184	197	214	--	--	203	106	828	318	337	162
Total	2,231	742	2,323	856	340	80	2,287	769	2,432	769	1,987	671
Other timber:												
Softwood	--	9	--	10	--	--	--	11	--	6	--	6
Hardwood	--	85	--	108	--	--	--	54	--	118	--	95
Total	--	94	--	118	--	--	--	65	--	124	--	101
Upland hardwood types:												
Growing stock:												
Softwood	232	57	--	--	268	58	292	68	223	61	219	53
Hardwood	1,106	365	--	--	113	25	2,104	671	974	335	930	306
Total	1,338	422	--	--	381	83	2,396	739	1,197	396	1,149	359
Other timber:												
Softwood	--	1	--	--	--	--	--	--	--	1	--	1
Hardwood	--	207	--	--	--	58	--	230	--	222	--	203
Total	--	208	--	--	--	58	--	230	--	223	--	204
Bottomland hardwood types:												
Growing stock:												
Softwood	1,425	442	2,050	566	652	170	1,554	475	1,355	429	1,221	393
Hardwood	1,993	749	4,325	1,423	2,791	956	1,892	749	1,649	616	2,107	749
Total	3,418	1,191	6,375	1,989	3,443	1,126	3,446	1,224	3,004	1,045	3,328	1,142
Other timber:												
Softwood	--	21	--	18	--	--	--	16	--	16	--	30
Hardwood	--	199	--	247	--	227	--	183	--	212	--	218
Total	--	220	--	265	--	227	--	199	--	228	--	248
All types:												
Growing stock:												
Softwood	1,297	472	2,085	763	888	285	1,388	505	1,101	408	1,134	412
Hardwood	641	240	332	126	289	96	663	260	654	241	691	246
Total	1,938	712	2,417	889	1,177	381	2,051	765	1,755	649	1,825	658
Other timber:												
Softwood	--	9	--	10	--	10	--	7	--	6	--	11
Hardwood	--	86	--	33	--	39	--	73	--	114	--	102
Total	--	95	--	43	--	49	--	80	--	120	--	113
All timber	1,938	807	2,417	932	1,177	430	2,051	845	1,755	769	1,825	771

1/ Rough and rotten trees.

Table 25.--Land area, by class, major forest type, and survey completion date, 1949, 1959, and 1970

Land use class	Survey completion date			Change 1959-1970
	1949 [2]	1959 [2]	1970	
	- - - - - Thousand acres - - - - -			
Forest land:				
Commercial forest land:				
Pine and oak-pine types	4,894.0	4,336.1	4,568.2	+232.1
Hardwood types	2,707.7	2,914.9	2,492.7	-422.2
Total	7,601.7	7,251.0	7,060.9	-190.1
Noncommercial forest land:				
Productive-reserved	6.1	12.3	13.8	+ 1.5
Unproductive	85.9	62.4	39.0	- 23.4
Total	92.0	74.7	52.8	- 21.9
Nonforest land:				
Cropland	1,108.2	1,079.3	813.7	-265.6
Pasture and range	295.6	468.2	794.8	+326.6
Other	546.7	790.8	912.4	+121.6
Total	1,950.5	2,338.3	2,520.9	+182.6
All land [1]	9,644.2	9,664.0	9,634.6	- 29.4

1/ Excludes all water areas.
2/ These figures differ slightly from reported figures because of revisions in the estimates of land area.

Table 26.--Volume[1/] of sawtimber, growing stock, and all live timber on commercial forest land, by species group, diameter class, and survey completion date

Species group	Year	All classes	Diameter class (inches at breast height)								
			5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0 and larger
			SAWTIMBER (in million board feet)								
Softwood	1949	7,840.2	--	--	2,609.5	2,474.6	1,584.6	634.3	287.5	87.1	162.6
	1959	7,336.8	--	--	2,276.9	2,398.8	1,407.2	696.0	313.1	130.0	114.8
	1970	9,169.4	--	--	2,563.2	2,655.3	1,896.8	1,089.8	553.9	203.0	207.4
Hardwood	1949	4,241.6	--	--	--	760.5	911.1	625.9	552.4	360.2	1,031.5
	1959	4,232.4	--	--	--	779.7	914.6	666.0	562.8	421.1	888.2
	1970	4,538.4	--	--	--	802.0	945.5	728.7	582.2	439.3	1,040.7
			GROWING STOCK (in million cubic feet)								
Softwood	1949	2,629.6	302.4	529.7	708.9	558.7	316.7	111.8	49.6	18.8	33.0
	1959	2,593.8	387.1	537.2	618.6	541.6	281.3	122.6	54.0	28.1	23.3
	1970	3,342.2	612.7	680.9	696.4	599.6	379.1	192.1	95.5	43.9	42.0
Hardwood	1949	1,527.1	139.4	174.5	215.6	228.6	231.5	147.5	111.1	76.7	202.2
	1959	1,585.4	153.1	191.0	240.6	234.4	232.4	156.9	113.2	89.7	174.1
	1970	1,698.5	163.6	222.0	245.3	241.0	240.3	171.6	117.1	93.6	204.0
			ALL LIVE TIMBER (in million cubic feet)								
Softwood	1949	2,673.2	311.8	538.7	718.7	562.6	320.8	112.5	50.6	19.7	37.8
	1959	2,637.6	399.2	546.3	627.1	545.4	284.9	123.4	55.1	29.4	26.8
	1970	3,402.1	631.3	692.8	705.5	603.7	383.9	193.2	97.5	46.0	48.2
Hardwood	1949	2,066.7	238.5	259.2	302.3	300.6	289.4	181.3	137.1	91.9	266.4
	1959	2,151.3	261.9	283.7	337.4	308.2	290.6	193.0	139.7	107.4	229.4
	1970	2,307.1	279.4	329.6	344.2	316.9	300.4	211.1	144.5	112.1	268.9

1/ To provide a basis for valid comparisons, adjustments have been made to allow for differences in volume tables and sawtimber specifications used in previous surveys.

DATE DUE

AUG 1 9 1999

RT/CO MAY 2 4 '99

DEMCO, INC. 38-2931

Clemson University
3 1604 013 265 618